THE *Soybean Digest*

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GEO. M. STRAYER, Editor — KENT PELLETT, Managing Editor

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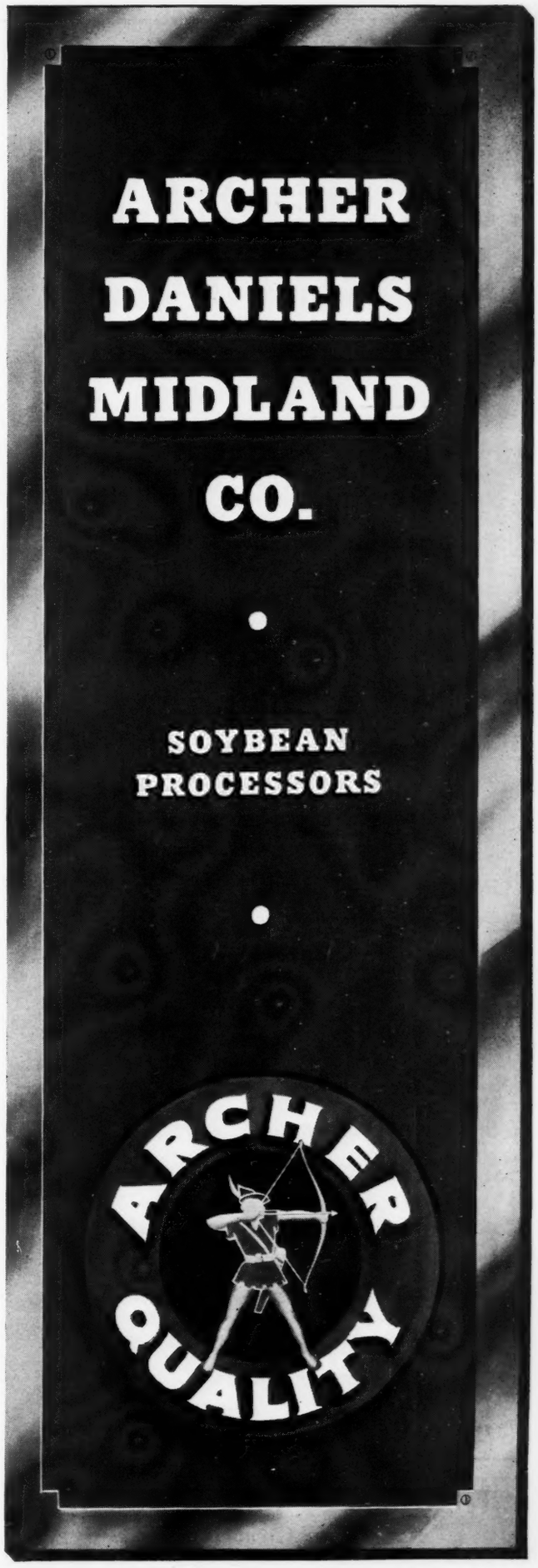

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EDITOR'S DESK

Soy Flour in New Demand

During the war years the soybean carried the major load in providing protein for livestock and poultry. It was also the major source of vegetable oil in a world cut off from former supplies, and which is still suffering deeply from a shortage of fats. And the soybean has helped supply the edible protein in this and a score of foreign nations in the form of soy flour.

In requesting greatly increased soybean crops the Department of Agriculture was wisely insuring against a disastrous protein shortage. The soybean crop, comparatively new to America, wrote a colorful chapter in the story of war-time and post-war feeding.

Soybean oil meal has been helping to rebuild some of the flocks and herds of battered Europe. Soybean oil, now the major edible vegetable oil, is in heavy demand, but is allocated abroad only on a sharply restricted basis.

Soy flour, now being called the "Little Giant of Proteins," is in demand in many parts of the world. The three soy flour types—full fat, lowfat and defatted—are now under general license and move freely without special allocation. Formerly when a foreign country purchased fullfat flour the oil content was deducted from its oil allocation. The bulk of the soy flour purchases have been lowfat and defatted types.

European countries have discovered that soy flour is a superior protein feed. They have likewise discovered what many of our responsible men in government discovered long ago—it is by far the lowest in cost per unit of protein.

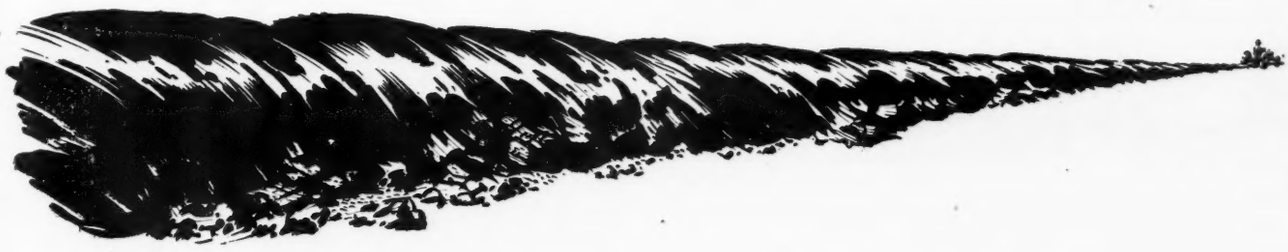
UNRRA has, in the past 2 years, shipped soy flour in volume to a score of nations in Europe and the Orient with the happiest of results. Shipments on its purchases continued right up to the last few days of UNRRA's feeding authority in late April, with a final 7,500 ton order. In the past 12 months UNRRA's purchases of soy flour have probably exceeded 130,000 tons.

With the expiration of UNRRA purchasing authority some of the countries that received the product are purchasing direct. One small country alone has been taking about 1,200 tons monthly to lift and extend the protein in bread, meat and numerous other foods.

Surprisingly, the Army was the slowest to take advantage of this protein product on a large scale. The alert and able quartermaster general, Major General Thomas B. Larkin, who has held the office but a comparatively short time, recently made a personal study of this low-cost product for civilian feeding in countries under Army control. This study was followed by an order for some 28,000 tons of soy flour for the Orient. It is confidently expected that the Army will take advantage of the relative availability of this product, and that further orders will follow.

With sharpened budgets of governments for purchasing in this and foreign lands, protein in the form of soy flour is in a very favorable position. Domestic usage

A Million Tractors Plowed This Furrow...



A Million More Are On The Way

THERE'S a long, straight furrow across America. It's the furrow plowed by the more than a million tractors that have come out of the Ford Motor Company.

And it will grow longer... much longer... because the Ford Motor Company is expanding for the production of more tractors.

These will be even better than the first million Ford has built.

They will have the solid engineering and sound value that come only from long experience . . . experience that began with the first Ford Tractor of 1906.

They will be powered correctly to do their work . . . whatever work they are given.

They will be simple to operate and maintain . . . and they will continue to put modern farming methods within reach of the average farmer, with hydraulic implement controls and the right implements.

There is another important point to remember. Ford *Service* for Ford Tractors will continue to be available throughout America. It will be experienced, economical service, consistent with the quality of the product itself.

And, of course, the Ford Tractors of today and tomorrow will be as thrifty to buy and run as Ford can make them.

To sum it all up, the Ford Motor Company is going on building tractors, and more of them. That's the best indication that Ford will continue to work with the American farmer for more production and better production, at the lowest possible cost.

FORD MOTOR COMPANY

has increased notably. Soy flour is one of the important market outlets for the soybean crop.

More Storage—Better Markets So long as the present system of soybean marketing prevails, we can never have orderly marketing or maximum returns to the man who grows the crop. Until we provide on the farms and in the farming communities adequate storage for at least 50 percent of the soybean crop, the average price paid for the crop will remain low.

During the war years we have developed a soybean marketing system wherein the crop, or a major portion of it, is marketed in a period of 4 to 6 weeks at harvest time. No marketing system based on supply and demand will pay maximum prices for a crop marketed in a haphazard fashion in one small interval of time, when the processing operation is conducted over the period of the entire year.

Soybean prices above $4 per bushel were of little benefit to the grower who had sold his beans last fall at $2.31 per bushel under ceilings. Yet, if a portion of the 1946 crop had remained in farmers' bins those farmers would have benefited.

Over a period of years the farmer who puts his soybean crop into storage takes advantage of the price rise which normally takes place between October and the spring months. That rise, according to figures published in the 1947 edition of the *Soybean Blue Book*, is sufficiently large, over a period of years, to justify provision of storage on the farm where the beans are produced.

The processor of soybeans, likewise, would benefit by farm storage. His facilities would not be overtaxed in harvest season, his investment would be held down, his turnover would be more rapid, his chances of operating over a long period of time would be better. He could afford to pay more for beans held on the farm. Because of the increased returns to the grower from the crop, the acreage would increase in proportion.

WE NEED MORE FARM STORAGE FOR SOYBEANS.

ASA's 1947 Convention Plans for the 1947 annual convention of the AMERICAN SOYBEAN ASSOCIATION, to be held in Columbus, Ohio on September 4, 5 and 6, are beginning to unfold. Meeting in Columbus in early May, the committee in charge of the event completed local arrangements for the field day, and made initial decisions pertaining to speakers and special events which will be included. Full details will be carried in later issues of the *Soybean Digest*.

In the meantime, we suggest that you put a red circle around the dates of SEPTEMBER 4, 5 and 6. Save them for the 27th annual convention and the biggest meeting in the history of the American Soybean Association!

Cooperating in the planning are representatives of the Association, the soybean processors, Ohio State University, the grain trade, and allied industries. Convention headquarters will be at the Deshlar-Wallick Hotel in Columbus. PLAN NOW TO BE WITH US.

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GROWERS

Corn Rootworm

Alternating corn with soys is all that is needed to control the northern corn rootworm, says H. B. Petty, extension entomologist of the University of Illinois.

This "eager beaver" among the insects that bother the corn crop can be stymied easily if the corn grower will remember never to plant a field to corn more than two years successively at the most.

Petty told of two fields, side by side, which he observed last summer. One had been in soybeans and the other in corn for several years.

In 1946, corn was planted where soybeans had been grown, and soybeans were planted where corn had been grown. There was, however, an exception to this rotation: To even up the acreage, the farmer had planted about 20 rows of corn in the old cornfield; he therefore had 20 rows of corn on ground which had grown corn for several years consecutively. The rest of the field of corn was on bean ground.

"The two were like different fields," Petty said. The 20 rows were down flat, while the remainder of the field was standing perfectly. The farmer estimated the difference in yield between 25 and 40 bushels an acre.

The Lincoln

Average yield of Lincoln during a 5-year period has exceeded Mingo, Dunfield, and Illini by 16 percent, report C. M. Woodworth, University of Illinois College of Agriculture and L. F. Williams, U. S. Department of Agriculture in their new bulletin on the Lincoln variety.

Average oil content of Lincoln is somewhat higher than that of these three varieties. In lodging resistence it is about the same as Mukden and Mandell and is exceeded only by Richland.

Lincoln has averaged slightly higher in seed quality than any other commonly grown variety. The seed is about the same size as that of Mukden; it is somewhat larger than that of Illini and somewhat smaller than that of Dunfield. Lincoln grows to about the height of Mingo, Mukden and Dunfield, but is several inches shorter than Illini. It matures about the same time as Mingo, Dunfield and Illini and slightly later than Mukden.

Copies of the new publication, *Lincoln: a Midseason Soybean, Bulletin 520,* may be obtained upon request to the College of Agriculture, Urbana, Ill.

An Iowa Winner

This is C. R. Winsell of Selma (southwest Jefferson County), Iowa. Though 74 years old, Mr. Winsell does all the work on his farm except during hay harvest. He was first place district winner in his soybean yield contest last year with a field of Richlands. He drilled his soybeans in 7½ inch rows, believes narrow rows give best results. He plowed early in the spring, then harrowed and disked frequently until planting time to kill weeds. He did not cultivate after planting and says he was not bothered with weeds. Mr. Winsell says his methods make for a level seedbed and easy combining. He is standing in Vanguard oats.

AS THE PRESS SEES IT

Grow More Soybeans

How many acres in corn are you planting this year? And how many acres are you putting into soybeans?

Think about the boxcar shortage and the corn-crib shortage before you decide.

Farmers with extra wheat and extra corn didn't get much benefit out of the March boom in grain prices. Many who wanted to sell couldn't move their grain to market.

The boxcar shortage will still be with us next winter, so far as anybody can tell. Corn may back up on farms because it is hard to market. We'll need a lot of new cribs to take care of a big crop.

Soybeans, within trucking distance of mills, present an easier problem. In many districts, a farmer who grows soybeans can get rid of them fairly soon after harvest.

The beans will be used up and will be out of the way before the 1948 crop comes in. The corn may pile up and cause us trouble by harvest time in 1948.

In actual cash returns, the corn loan looks better than the support price for soybeans. But farmers also need to think

CASE HISTORY No. 15

One in a series of factual experiences of a group of American manufacturers with Multiwall Paper Bags.

COST COMPARISON
(Per Ton)

	200-lb. barrels	75-lb. paper bags
Container cost..	$16.50	$ 4.07
Labor cost	2.60	1.30
Total bag and labor cost...	$19.10	$ 5.37
Saving per ton paper over barrels ...		$13.73

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A recent addition to the growing list of products packaged in multiwall paper bags is Pentek — a powdered alcohol manufactured at the Garfield, N. J., plant of the Heyden Chemical Corporation.

This chemical formerly was packed in 200-lb. wooden barrels. But these containers were costly, difficult to handle, and according to company officials "ate up too much valuable storage space." In addition, the filling operation was inefficient, dusty, and expensive.

To overcome these objections, in 1946 the company installed a St. Regis automatic bag filling machine and switched to multiwall paper valve bags. These five-ply containers are made with an asphalt-laminated sheet to protect the product against moisture, and a tuck-in sleeve valve for added protection against contamination. The results of this new packaging system? These impressive three-way savings:

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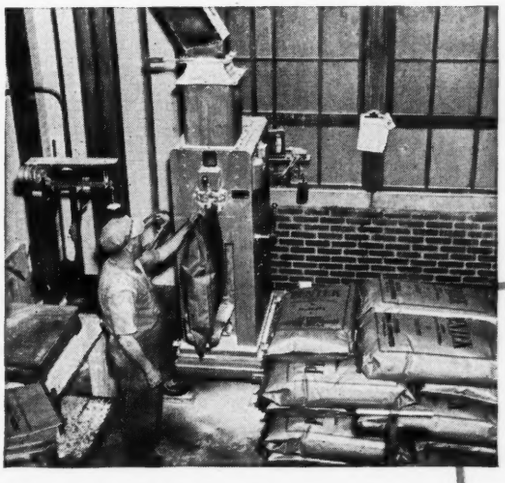
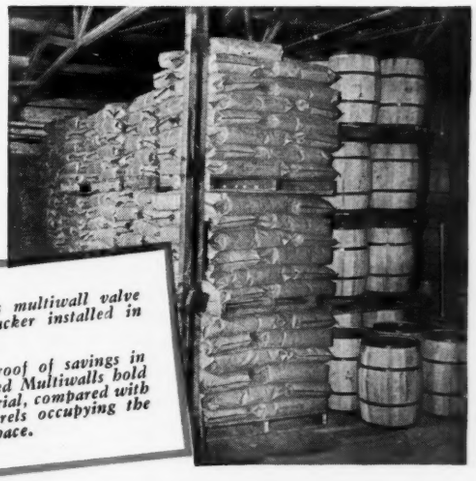
- ***Labor costs dropped 50%***
- ***Savings in storage space totalled almost 50%***

But that's not the whole story . . . customers like Multiwalls because they save storage space and reduce handling time and labor. Plant officials are enthusiastic about Multiwalls' eye-appeal which resulted from colorful bag printing. Plant workers find Multiwalls easy to handle and praise the elimination of dust from the packaging operation.

Mail the coupon for an illustrated folder giving full details. Learn how a St. Regis Packaging System can improve your packaging operation.





Left: *One man fills multiwall valve bags on 100-LS packer installed in Heyden plant.*

Right: *Dramatic proof of savings in space . . . palletized Multiwalls hold 27,000 lbs. of material, compared with 16,000 lbs. in barrels occupying the same amount of space.*

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ALCOA

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about marketing problems, about boxcars and corn cribs, and about the carry-over into 1948.

Farmers are planning a big soybean acreage. Those who figure on a price this fall like the price now will be disappointed. But they may get paid in other ways.—*Wallace's Farmer.*

LETTERS TO THE EDITOR

Bean Market

To the Editor:

Just received the April issue. I really enjoyed reading the article, "How the Champs Grow Soybeans," as I feel I can always learn something new.

I wish to call to your attention the fact that our St. Joseph papers never quote soybean markets along with other grains which is quite a handicap for the soybean grower.

Can you do anything about it?—E. W. Trachsel, Helena, Mo.

From Argentine

To the Editor:

Almost all the (soybean) production is consumed in this country. We do not have any exportable balance. Almost all is used industrially, very little for human consumption.

The government will initiate an extensive campaign for cultivation of a zone of 50,000 hectares. For this purpose it has imported seed from the United States, Santo Domingo and Uruguay. The crop will be utilized for making flour, bread, confections, baked goods; and the oil will be used for perfume and toilet soaps, sauces, shortening, etc.—La Germinadora, producers, importers and exporters, Buenos Aires.

The Blue Book

First edition of the *Soybean Blue Book*, published last month, has been very favorably received. Following are some of the comments which have reached the desks of the editors:

We received our copy of the *Blue Book* and think it is mighty fine, and we certainly enjoyed it very much.

I would like two more copies.—S. O. Frey, Manager Farmers Union Jobbing Association, Girard, Kansas.

I have received a copy of the 1947 *Soybean Blue Book* and want to tell you that it is all you said it would be and then some. You are certainly to be congratulated on putting out such a fine directory which will be of real value to the industry. —C. E. Butler, President Borden's Soy Bean Processing Co., Waterloo, Iowa.

We have just received the first edition of the *Soybean Blue Book* and want to congratulate you and your organization on the excellent job done. It really compiles valuable information for all phases of the soybean industry.

We would like to have about five extra copies for various people in our organization.—W. W. Hastings, Buckeye Cotton Oil Co., Cincinnati, Ohio.

It is just the type of research information most valuable for our files in answering the many inquiries we receive from time to time.—Bernard F. Nowack, assistant director Iowa Development Commission, Des Moines, Iowa.

The writer wishes to congratulate you upon the compilation of so interesting a publication. It goes without saying that we know something about the tremendous task involved when it comes to preparing something of that nature.—C. H. Chase, secretary-treasurer, Iowa Retail Farm Equipment Association, Ames, Iowa.

I want to congratulate you on a very excellent job of assembling the information and editing same. I think the layout is splendid and you and your staff deserve every commendation for a job well done. —Howard L. Roach, J. Roach Sons, Inc., Plainfield, Iowa.

I want you to know that I think you have done a marvelous job in that publication. There is a world of information in the book, and I know that the growers and the industry will find it very helpful in handling the daily problems and inquiries which we all receive.—R. G. Houghtlin, president National Soybean Processors Association, Chicago, Ill.

I have just finished reading from cover to cover the *Soybean Blue Book*. You have launched a volume which, in my opinion, will be as permanent as the crop itself.—Edward J. Dies, chairman of the board, Soy Flour Association, Washington, D. C.

You and your staff should be congratulated for the large fund of information collected, and I am sure the *Blue Book* will be of help to all of us.—J. L. Cartter, senior agronomist, U. S. Regional Soybean Laboratory, Urbana, Ill.

The *Blue Book* . . . has a lot of information that is very helpful to us. I also want to congratulate you on the splendid edition that you put out.—Mark G. Thornburg, secretary Western Grain and Feed Association, Des Moines, Iowa.

'47 YIELD CONTESTS IN FIVE STATES

Eugene Gwaltney (left), Indiana soybean champ for 1945, receives the Roy Caldwell trophy for his achievement. Gwaltney's yield was 51.9 bushels.

Contests in Missouri, Iowa Arkansas, Illinois, Indiana

Soybean growers will have a chance to compete against each other for prizes and the title of state soybean yield champion in the four states of Indiana, Illinois, Iowa and Missouri this year.

And Mississippi County, Ark., one of the nation's leading soybean counties, is holding its own soybean yield contest this year. It is sponsored by the Blytheville, Ark., Junior Chamber of Commerce. The Jaycees there also sponsor the annual National Cotton Picking Contest.

INDIANA
CONTEST

In Indiana, the annual 2-Acre Soybean Yield Contest is sponsored by the Indiana Corn Growers' Association, as in the past.

All contestants must be members of the Association, with dues paid by June 15. The best 2 acres from a field of at least 10 acres of yellow soybeans may be selected by the grower, or the yield of the entire measured field may be taken.

The state winner receives the Roy Caldwell trophy to be retained for 1 year. Bronze medals are awarded for 30-35 bushel yields; silver medals for 35-40 bushel yields; gold medals for 40-45 bushel yields; green-gold medals for 45 bushels; and rose-gold for 50 bushels and up. Donor of the medals will be Central Soya Co., Inc., Decatur, Ind.

Growers who would like to enter the Indiana contest and have their fields checked are asked to notify their county agents.

For further information write:
K. E. Beeson, Secretary
Indiana Corn Improvement Association
Lafayette, Ind.

ILLINOIS
CONTEST

The 7th annual Illinois 10-acre Soybean Growing Contest is sponsored by the Illinois Crop Improvement Association.

Any farmer in Illinois is eligible to enter the contest, by paying a $1 membership fee and a $10 entrance fee. Growers may enter by signing an application blank in the local county adviser's office or applying directly to the Association. Entry blanks and sketches of entrants' farms and contest fields must be forwarded before June 1 to:

Illinois Crop Improvement Association
Urbana-Lincoln Hotel
Urbana, Ill.

Harvesting of contest fields will be done before November 1 by a committee working under a captain appointed by the Association. There will be appropriate awards on a regional basis for the five sections of

(Continued on page 34)

• To enter the contest in your area contact your sponsoring organization as listed in this article.

★ ★ ★

THIS IS WAY 1946 INDIANA WINNERS GREW THEIR CROP

The *Soybean Digest* in April reported on the methods used by Illinois and Iowa soybean yield contest winners in producing their winning crops last year.

For May we asked state and district winners in Indiana to report on their practices. Eleven of them responded. In the main, their practices are similar to those used by Iowans and Illinoisans as reported in April.

Like the other two states, nearly all of the Indiana contest winners grew Lincolns. Most of them included clover, alfalfa or pasture in their rotations. Most used commercial fertilizer or manure or both in the plots entered in the contest some time during the past 2 years.

Hoosier winners planted from 55 pounds to 2 bushels of seed per acre, and averaged 1.3 bushels. This is very close to the Illinois average of 1.2 and ½ bushel under the Iowa average of 1.7.

When it came to width of rows, Hoosiers stuck much closer to standard corn-row widths than did the winners in the other two states. Most Illini and Iowans planted narrower than corn-row width. The majority of Illinois winners planted 22 inches or narrower. But two-thirds of the Indiana winners planted in 34-to-40-inch rows.

Indianans gave their ground lots of cultivation. All but two cultivated (including disk and harrow) two to four times before planting, and an equal number after planting.

George Shell of Anderson, Indiana soybean champion for 1946, who broke all his state's yield contest records with his 55 bushel per acre, tells of his methods: "The ground was plowed in March. I let it lay until May 1. I disked and dragged it three times. The ground was fine as dust. I took the tractor and corn-planter and planted these beans in 40-inch rows, using 1 bushel to the acre. These beans were planted from ½ to 1 inch deep in deep furrows made by furrow openers. When these beans came up the first thing I did was to cultipack and hoe. This operation was done three times. Then I used the tractor and plowed them three times, once each week. This got rid of the weeds. In plowing beans I use a 12-inch

(Continued on page 34)

EFFICIENCY *thru* HIGHER YIELDS

The Best Solution to Many of Today's Soybean Problems

By D. F. BEARD
Extension Agronomist, Ohio State University, Columbus, Ohio*

THE AVERAGE soybean yield in the Cornbelt could be increased from the present 19½ bushels per acre to 25½ or more bushels per acre and THE COST OF PRODUCTION PER BUSHEL REDUCED if all farmers would adopt the best practices in growing the crop.

The following table illustrates how the full use of various practices could be expected to affect the average yield:

Grow recommended varieties ..... Add 2½ bu.
Proper seedbed and seeding . Add 1 bu.
Timely planting ..... Add ½ bu.
Adequate weed control ..... Add 1 bu.
Rotation and soil practices .. Add 1 bu.

On individual farms some of these practices are already fully employed. On relatively few farms, however, are all worthwhile steps being taken to insure highest practical acre yields. The indicated gains possible on a nationwide basis can be greatly exceeded on individual farms.

BETTER VARIETIES

The choice of better varieties now offers the most promise in stepping up soybean yield. Relatively few varieties are required to satisfy the needs of the major soybean producing areas.

No practice will return as much for as little extra trouble and cost as the regular use of good seed of the best varieties.

SEEDBED PREPARATION AND SEEDING

The seedbed should be prepared to assure uniform depth of planting and rapid germination. All germinating weed seeds and weed growth should be destroyed immediately prior to planting. The optimum depth of planting is about 1 inch.

The amount of seed required will depend on the method of seeding. When planted with the grain drill in solid plantings, 1½ to 2 bushels per acre of good seed gives best results. In row plantings highest yields have been obtained with seeding rates of 40 to 70 pounds per acre.

Either method of planting may give good yields, but the difference that usually exists favors row plantings. Much of the favorable difference for row plantings can be attributed to better weed control and other benefits of cultivation.

ALWAYS INOCULATE THE SEED

Inoculation of soybean seed has become almost a universal practice. The cost of insuring the maximum yield and soil building potentialities of the soybean crop is so low that it is always good business to inoculate.

TIMELY PLANTING

Corn planting time is the best time to plant soybeans. Why then, are soybeans usually planted after the corn planting is finished? The following table of experimental results gives the answer. (Data summarized from several sources.)

Time	Relative Yields Corn Pct.	Soybeans Pct.
10 days earlier	95	98
Optimum date	100	100
10 days later	98	97
20 days later	89	92
30 days later	70	89
40 days later	57	74

Because yields of soybeans drop off less rapidly than corn yields in delayed plantings, farmers choose to delay soybeans rather than corn when a choice must be made. In some seasons most of the beans are planted by June 1. In others, very few are planted by that date. By completing soybean planting by June 1-5 instead of June 15-20, the yield could be increased ½ to 1 bushel per acre.

ADEQUATE WEED CONTROL

In row plantings on weedy land, two or three cultivations are necessary to control weeds. Where drills and cultivators are

* The writer acknowledges with appreciation the assistance of Lewis C. Saboe, agronomist, U. S. D. A., in the preparation of this article.

available, 21-inch rows are ideal. Where such machinery is not available the corn planter can be used, especially for the Lincoln and later varieties.

With Earlyana and Richland, in row plantings, best yields come from rows spaced 21 inches apart. Their yields will drop off rapidly as the row width is increased above this figure. Lincoln will yield equally well in 21-inch or 28-inch rows and nearly as well in 35-inch rows. If rowing is desired, therefore, and corn planting and cultivating equipment is the best available, it can be used most satisfactorily with the Lincoln variety. A standard 40-inch spaced two-row planter can be driven to give an AVERAGE row spacing of 33 inches by shortening the marker 14 inches. To cultivate such plantings it may be necessary to remove the outside cultivator shovels.

While weeds can be controlled in row plantings more easily than in solid ones, a large percentage of the crop is planted solidly with the grain drill. About two-thirds of this acreage is never touched from planting to harvest time. One-third of the acreage is cultivated with a rotary hoe or spike-tooth harrow.

In experiments at Wooster, Ohio, where soybeans were used for hay, an increase in yield of 25 percent was obtained for one cultivation with a rotary hoe followed by a harrow. The growth of the soybeans seemed to be stimulated along with the weed control. Farmers report increases in grain yields of 1 to 4 bushels per acre as a result of cultivating solid beans.

ROTATIONS AND FERTILITY

It is sometimes argued that soybeans can be grown on a field continuously without a drop in yield. Occasionally claims are made that the second and third crops of soybeans on the same field will be better than the first.

It is interesting to note what happened at the Ohio Agricultural Experiment Station when corn and soybeans were grown on the same areas for 15 years as compared with a 2-year rotation of the same crops, corn-soybeans.

Yield in Bu. per A.		2-year Rotation
Contin. Corn	Contin. Soybeans	Corn-Soybeans
27	13	55 18

When the less depleting 4-year rotation corn-soybeans-wheat-clover was used the corn yield rose to 67 bushels and the soybean yield to 21 bushels.

From these and other experiments it is reasonable to conclude that highest soybean yields may be expected in balanced crop rotations similar to those that give highest corn yields.

At the same time, it is recognized that on certain soils soybeans can be grown more frequently than on others without injury to longtime yields.

Why soybeans do not respond to fertilizers as corn, wheat, and clover do is still a mystery. Soybeans require lime, phosphate and potash in liberal quantities. Lime alone on moderately acid soils increases soybean yields significantly. Since phosphate and potash fertilizers give higher dollar returns when applied to other crops in the rotation it may be wiser to put more fertilizer on those crops and omit the application on the soybeans. This is especially true if an additional operation is required to place the fertilizer so that it is not in contact with the soybean seed.

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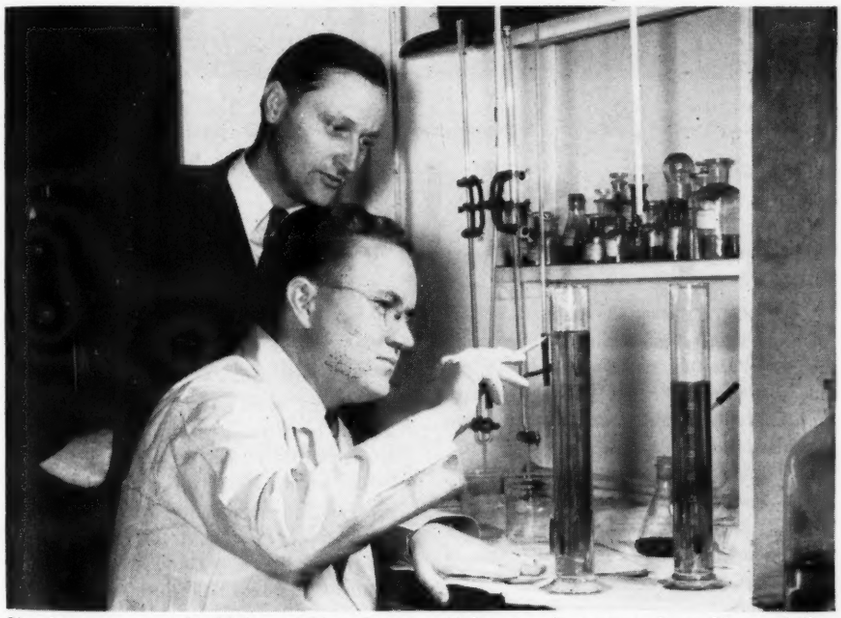

Lincolns are not only higher yielders but are higher in oil content than older varieties. Here Dr. Beard and Dr. J. Boyd Page, also of Ohio State University, compare the oil obtained from Lincoln and that from another variety. Oil in the tube at left is from Lincoln.

SUMMARY

Full employment of proven practices on the part of all soybean growers promises not only greater profit from growing the crop, but also an increased yield of soybean oil and protein per acre.

1. Plant only the highest yielding varieties on the entire soybean acreage. This will add 2 to 3 bushels to the national average acre yield.

2. Plant high-germinating seed in a properly prepared seedbed. Add 1 bushel per acre thereby.

3. Complete soybean planting by June 1-5. This should add ½ to 1 bushel per acre to the average yield.

4. Control weeds by cultivating the growing crop whether it is planted solid or in rows. Gain 1 to 4 bushels.

5. Grow soybeans in a good, well-fertilized crop rotation and gain 1 to 5 bushels per acre.

How many of these gains can you add to YOUR 1947 soybean yield? Are YOU using the best variety for your farm? Are YOU controlling weeds by cultivating your soybeans?

A LECITHIN USE

Fat-containing powdered dairy products having improved mixability, solubility, flavor and keeping quality, and the method for making such products, are the subject of a recently patented invention. The discovery comprises thoroughly dispersing lecithin or lecithin-containing substances in the fluid product to be powdered, the amount added to be confined within the ranges of 0.5 and 3.0 percent.

Specific benefits claimed are: (1) That the reconstituted product does not have the defect of chalkiness, but has the freshness and richness of flavor of the original fluid product; (2) powdered cream will go into suspension in cold water with a minimum of stirring and (3) reconstituted products do not become foamy to the same extent as products made by conventional methods.

This process is applicable to powdered milk, powdered milk-skim milk mixtures, powdered cream, powdered milk cream mixtures and powdered ice cream mixes.

See U. S. Patent 2,399,565, issued to G. C. North and A. J. Allen, and assigned to Beatrice Creamery Co., Chicago, Ill.

—s b d—

Perilla belongs to the mint family. The seed produces a rapid-drying oil used in paint and varnish.

INOCULATED SOYBEANS*

Yield 20 percent more BEANS per acre.

Contain 9 percent more PROTEIN in beans.

Produce 30 percent more PROTEIN per acre.

Contain 3.5 percent less OIL in beans.

Produce 16 percent more OIL per acre.

* Average of experiments by Iowa Agricultural Expt. Station.

By DR. A. G. NORMAN

Formerly with Iowa State College, and at present performing special agronomy duties for the United States Army Chemical Corps.

INOCULATION

WHY SHOULD SOYBEANS BE INOCULATED?

1. The soybean is a legume and as such possesses the property peculiar to that group, of developing root nodules which are packed with large numbers of bacteria. These bacteria, when in the nodule, have the faculty of "fixing" nitrogen from the air and combining it with carbon and hydrogen in compounds which the bacteria and the legume can use in building protein. The association of plant and bacteria is normally a mutually beneficial one. The bacteria are supplied with soluble food material by the plant, so that large numbers develop. The legume on the other hand is supplied with nitrogen. Plants other than legumes are entirely dependent on the supply of available soil nitrogen to meet their nitrogen needs for protein; legumes have in addition this supplementary source provided by the nodule bacteria.

2. The bacteria are not carried within the legume seed and only enter the plants and cause nodules to form if they are present in the soil in which the seedling is developing. Seed from a well-nodulated plant, if sown in the soil from which the nodule bacteria are absent, will not give nodulated plants.

3. The bacteria are capable of living in the soil as well as in the nodules of a legume, but when free in the soil do not have the ability of fixing nitrogen and must compete for soil nitrogen and other nutrients with innumerable other soil organisms, many of which are more vigorous and better adapted to use the food supply in the soil. Though released into the soil in great numbers when the nodules disintegrate as the crop matures or is harvested, legume bacteria rapidly decline in numbers. They may, however, persist for years in the absence of a legume crop but after a time there may be too few to produce good nodulation on a later crop. How fast this happens seems to vary with soil conditions. Some fields 4 years after having a bean crop have had too few bacteria left for good nodulation; others after 25 years have still contained sufficient. In general, persistence is likely to be much greater in fertile productive land than in acid worn-out land.

4. All legumes are not inoculated by the same bacteria. There are many different kinds of legume bacteria. Those that form nodules in the soybean do not inoculate any other legume crop. Accordingly, soybean bacteria will only be present in the soil of any field if it has previously borne a well-nodulated soybean crop.

5. Bacteriologists now recognize that there are "good" and "poor" strains of legume bacteria, or strains which are good or poor in their efficiency in fixing nitrogen in the widely grown soybean varieties. In greenhouse experiments it is possible to select those efficient strains that will aid the plant the most, and to reject poor strains that would be of little benefit to the plant. The important thing in inoculating legumes is not just to produce nodules but to produce them with the most efficient strains. Producers of commercial legume inoculants recognize this and by field and greenhouse tests select the best strains they can find. These are then mixed together in the cultures they offer for sale.

HOW TO INOCULATE SOYBEANS

1. The best advice that can be given as how to inoculate soybeans is that the instructions on the box or bottle be followed. Commercial inoculants are of two types. There is the "humus" type which is made by growing the bacteria in a sugar solution which is then blotted up or absorbed onto finely ground peat. This is then packaged in such a way that moisture will not be lost. In the "jelly" type the

—USDA Photo by Ackerman

Garvin County, Okla., farmer examining nodules on the roots of soybeans.

bacteria grow on the surface of an agar gel in a bottle.

2. For use, the peat or the slimy growth on the jelly must be suspended in a minimum of water and mixed with the seed before planting. The instructions should be followed with respect to proportions, because these are developed by the producers with knowledge of the numbers of organisms present in the cultures. Nothing will be gained by "over-inoculating". Conversely, stretching the inoculant over more seed than it is intended for may give poor results.

3. The legume bacteria will only remain viable in large numbers in a moist environment. The "humus" cultures should not be opened, part used and allowed to dry out before the remainder is used. Inoculated seed should be planted within a few hours of treatment. Excessive precautions against drying or exposure of the inoculated seed are not necessary.

EFFECTS OF INOCULATING

1. Soybean plants when nodulated have a supplementary source of nitrogen. There is every reason to believe that nodulated beans use about as much soil nitrogen as do unnodulated beans or as a similar non-legume crop might do. Advertisements for legume inoculants sometimes state or imply that because they are nodulated, soybeans no longer use soil nitrogen, which is therefore "saved" for a later crop. This has not been proved to be the case. The only way in which the soybean crop harvested for beans "adds" nitrogen to the soil is to the extent that the residues contain more nitrogen than would the residues of a non-leguminous crop.

2. Unnodulated beans do not fail as a crop on ordinary Cornbelt soils. Indeed it may be difficult or impossible to determine by simple inspection whether a bean crop is nodulated or not. Ordinarily the leaves may be a slightly lighter color than those of inoculated beans, and may turn yellow and be shed earlier.

3. The supplementary source of nitrogen provided by the legume bacteria results in an increase in yield. Nodulated soybeans therefore outyield unnodulated soybeans. The extent of the yield increase produced depends on the amount of soil nitrogen available. Where this is low, as in soils of poor fertility, a higher percentage increase in yield will follow proper inoculation than in productive soils where the soil nitrogen supply is good. Even in the latter some yield differential occurs. On prairie soils in Iowa of moderate fertility, inoculation has increased yield by 20 percent with a range of 10-30 percent according to fertility status. The amount of nitrogen fixed under such conditions is not more than 20-25 lbs. per acre. Usually about three-fourths of the nitrogen in the plants comes from the soil.

4. Apart from increasing bean yield proper inoculation causes other differences in the plants. Because it improves the nitrogen supply, the protein content of nodulated beans is higher than those from unnodulated plants. The difference averages out at 9 percent increase, which taken in conjunction with the average yield increase mentioned above amounts to production of 30 percent more protein per acre.

5. Beans from an unnodulated crop are lower in protein but higher in oil content than from a nodulated crop. Inoculation therefore reduces the oil content of the beans. The average figure in our experiments has been -3.5 percent. This reduction is, however, more than offset by the increase in yield so that on an acre basis the oil production has been increased by an average of 16 percent by inoculation.

6. Inoculation of soybeans on ordinary Cornbelt soil does not usually affect the stand as is the case with small seeded legumes. Instances have occurred, however, where survival of the young plants in the face of intense weed competition has been improved by inoculation.

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SOLVENT METHOD FOR COTTONSEED MEATS

Fractionation of cottonseed meats into three parts—oil, pigment-free meal, and pigment glands, instead of just oil and meal, which are the products of normal commercial processing — is being accomplished by a new solvent extraction method, the U. S. Department of Agriculture announces.

The principle of the new process is based on laboratory investigations by chemists who observed that most of the coloring matter in cottonseed meats is "bottled up" in small heavily walled glands which are lighter in weight than the other parts of the kernel. Upon agitation of the flaked meats in a carefully compounded solvent, the meal sinks and the glands float in the oil-solvent mixture, called miscella.

Scientists investigating the colored compounds inside the glands have identified the familiar pigment "gossypol," and two others not previously recognized.

The information on pigments and on pigment-gland separation is a major contribution to the development of potential commercial processes for solvent extraction of cottonseed oil, which by extracting more oil would do away with important losses occurring with mechanical extraction. Present day commercial cottonseed meals contain on the average about 6 percent oil which has had to sell at meal price. By recovery of this oil, *with solvent processes comparable to those employed in the soybean industry*, the quantity of oil produced would be increased by about 200 million pounds annually.

Walter M. Scott, director of the Southern Regional Research Laboratory, states that this method of fractionating cottonseed has been taken into the pilot plant to be tested for commercial feasibility.

SOYBEAN PRODUCTION *Here and Abroad**

By ROBERT M. WALSH
Special Assistant to the Chief
Bureau of Agricultural Economics

WORLD production of soybeans is concentrated largely in two areas, in China and Manchuria on the one hand and in the United States on the other. Before the war, Asia produced 400 million bushels of soybeans a year; the United States, 56 million.

In prewar days, China was the leading producer of soybeans. It had an annual out-turn of slightly over 200 million bushels. All of this was used domestically. Manchuria, with an output of 150 million bushels, was the world's chief exporter. The United States, Korea, Japan, and the Netherlands Indies were the only remaining producers of any consequence. Contrary to popular belief, output in southeastern Europe was extremely small.

Soybean culture, although ancient in China, is comparatively new in the United States. Official estimates of production begin in 1924. In that year we grew 5 million bushels, mostly for seed use. Ten years later production had mounted to 23 million bushels, with an increasing proportion of the output going to oil mills for crushing. The severe drought of 1934 was a notable factor leading to the present-day importance of soybeans as a cash crop in the United States. Soybeans proved to be more drought-resistant than corn. In 1935 farmers more than doubled their 1934 production. Further gains were made in 1938 and 1939. Production in 1939 reached 90 million bushels.

The increases in soybean output beginning in 1935 were made with an average ratio of soybean prices to corn prices of less than 1.8 to 1. An increasing surplus of corn in 1938 and 1939, and the successful use of machines in soybean culture, added to the popularity of the new crop.

Before 1935 the largest single use of soybean oil was in paint and related products. Drought-induced shortages of lard in 1935-37 resulted in a rapid gain in the use of soybean oil in shortening. Technological improvement in the quality of refined soybean oil, as well as its comparatively low price, led to rapid increases also in margarine and other food products. *By the late 1930's, the use of soybean oil in paint, soap, and other nonfood products, although larger in amount than in the early 1930's, accounted for only a small part of total use.*

Cottonseed oil was and still is the principal competitor with soybean oil in processed food fats. In drying-oil products, linseed oil was the chief competitor with soybean oil during the 1930's. But use of soybean oil, fish oils, tung oils, and perilla oil were expanding in that field, mainly at the expense of linseed oil.

To sum up, soybean oil made notable gains in production and use during the late 1930's. This upward movement was sharply accelerated by the war which followed.

WAR-TIME ROLE

Throughout most of 1940 the United States had large supplies of domestic and imported oils, and prices were low. And our consumption of fats in 1941 was the largest in peace-time history.

Real trouble began in 1942. Imports fell abruptly after the Japanese attack on Pearl Harbor. The United States had been dependent on Pacific sources for about half its imports of fats and oils. In the five years 1937-41, imports had averaged 2 billion pounds annually. From 1942 through 1946, yearly imports were less than half that amount.

The major loss was in coconut oil. Imports of that oil declined from about 700 million pounds to less than 200 million pounds, with shipments of coconut oil and copra from the South Sea Islands and Ceylon making up in part for the complete loss of Philippine supplies. The second major loss was in palm oil from the Netherlands Indies. Third in major importance was tung oil from China. In addition, the United States previously had lost nearly 100 million pounds of imports of olive oil from the Mediterranean region, and fairly sizeable quantities of fish and fish-liver oils from the European North Atlantic area.

During the critical years of the war, few American ships made the long and dangerous West African run. Moreover, palm kernels and palm oil from West Africa were desperately needed by the British, and U. S. imports of those items were small.

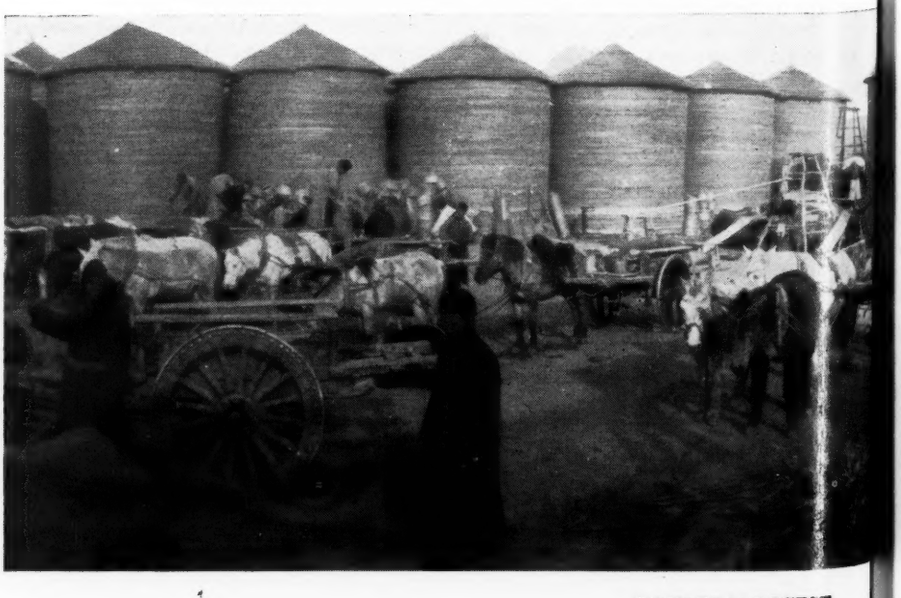
As a partial offset to these losses, imports of some oils and fats from South America increased, notably sunflower oil and rapeseed oil from Argentina. Imports of South American linseed oil were large in some war years, but disappointingly small in others.

The United States during the war suffered a large loss in imports of oils and fats yet demand for those products was abnormally high. Civilian employment and income were greatly above prewar. The demand for exports under lend-lease rose to high levels; military procurement was heavy; and, later, requirements for foreign relief became large.

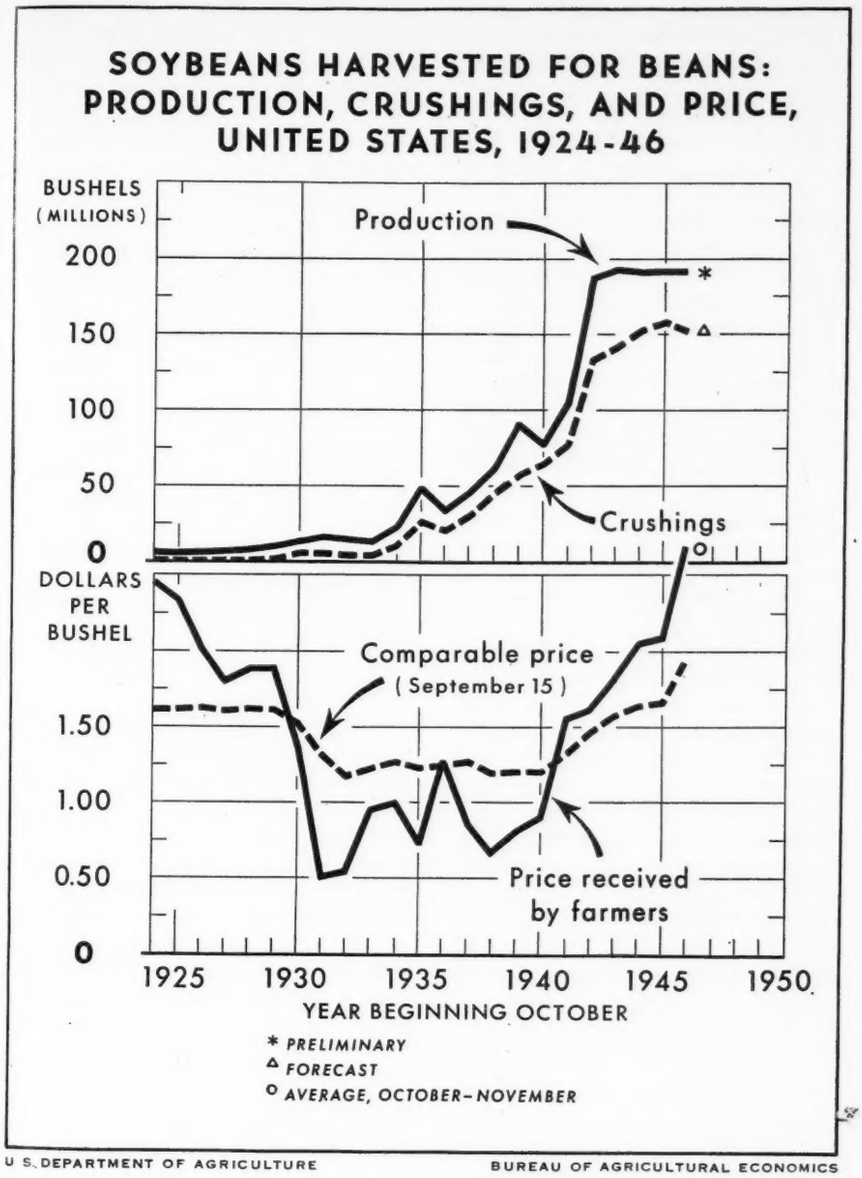
Under these circumstances, two lines of attack were indicated: First, to increase

Manchurian soybean production is down and no Manchurian beans have appeared in world trade since the war, though formerly that country was the world's leading exporter of soybeans. Seen here is a storage yard of a Manchurian grain merchant.

—Photo Courtesy W. J. Morse



* Paper presented before the Soybean Conference, Northern Regional Research Laboratory, Peoria, Ill., Feb. 27-28.



our production; second, to ration supplies. Both courses of action were pursued.

Soybean production went up. To induce larger output, AAA restrictions on soybean acreage were partially relaxed in June 1941. The government offered to support prices of 1941-crop soybeans at approximately $1 per bushel. These actions, together with rising market prices, brought forth an increase of over 1 million acres in soybeans harvested for beans.

An all-out war production program for oilseeds was launched in 1942. High production goals were set for soybeans, flaxseed, and peanuts. The castor-bean seed program begun in 1941 was broadened. Large-scale increases in livestock production were fostered.

As a result of various government measures, favorable market prices, and good-to-excellent growing conditions, production of fats from domestic materials advanced. Total output increased from an average of 8.7 billion pounds for the five crop-years 1937-41 to 10.7 billion pounds in the year beginning October 1942. It reached a wartime peak of 11.2 billion pounds in the 1943 marketing year. The principal increases in production were in lard, tallow, greases, soybean oil, and linseed oil.

Production of soybean oil showed consistent gains throughout the war. Output increased from some 500 million pounds in the 1940 season to over 1,200 million pounds in the 1942 season. Further gains brought production of soybean oil to over 1,400 million pounds in 1945-46.

It was not possible in the later war years to hold all the increases. Production of lard and greases, linseed oil, cottonseed oil, and butter fell off. Despite steady increases for soybean oil, total output of fats declined to 9.5 billion pounds in the 1944 marketing year and to about 9 billion pounds in the 1945 season.

SHORT DURING THE WAR

Except for the peak production year 1943-44, fats and oils were continuously in short supply during the war. As a means of assuring adequate supplies of fats for war uses, rationing at the manufacturing level was begun in October 1942. During the course of the war, rationing took several forms.

To aid its allies, the United States shifted from a net importing to a net exporting basis in fats. That is, from a net importer of 1.5 billion pounds the United States became a net exporter of over 600 million pounds in two of the most critical war years, 1943 and 1944. The United States continued to be a net exporter in 1945 and through the first half of 1946.

Civilian consumption of visible food fats declined during the war from an average of 46 pounds per person in 1937-41 to 40 pounds in 1945. Consumption of fats in nonfood products—soap, paint, linoleum, and so on—remained comparatively steady at about 24 pounds per person. In view of the unusual demands, supplies of those products appeared critically short at times.

The wartime role of soybean oil meal was no less colorful than that of soybean oil. With output jumping from a million tons to over 3 million tons a year, soybean cake and meal made important contributions to victory on the food front. Large supplies of protein supplements were essential to the record production rates achieved for milk and eggs, and contributed in some measure to the record outputs of pork and beef. Soybean proteins also found their way directly into human consumption.

Use of soybeans for full-fat flour in 1943-46 averaged about 1½ million bushels a year. Most of the full-fat flour was produced for export. Use of soybeans for low-fat flour, after extraction of oil, averaged about 5 million bushels annually. Around 2 million bushels of this went into flour for commercial use in the United States and the remainder into flour for export. Use of soybean flour in the United States is likely to increase gradually as

AND POSSIBLE COMPETITION FROM OTHER OILSEEDS

It may be 10 or 15 years before world oilseed supplies become excessive, the author says.

continued trial and research lead to better types of flour. Soybean flour in recent years has been used principally in bakery products, meat products, cereal mixes, candy, and dog food.

EARLY POSTWAR SITUATION

Today, with most of the war regulations ended, we find fats and oils in short supply on a world-wide basis. The situation in the United States is affected by the critical shortages in Europe. Before the war, continental Europe produced about 10 billion pounds of fats annually, and imported nearly 5 billion. Production on the Continent in 1947 will total less than 8 billion pounds, and imports will be between 2 and 3 billions. Thus, for the Continent as a whole, excluding Russia, consumption of fats will be less than three-quarters of prewar. Perhaps the worst deficiency areas today are Germany and Austria.

Europe's recovery in fat production probably will be slow. Its greatest deficiency is in hog fats. After World War I, eight years were required to restore hog numbers in Europe to prewar levels. Production of other animal fats may recover more rapidly, as numbers of milk cows and other cattle were not reduced so drastically as hog numbers. At the earliest, however, total fat production on the Continent is not likely to reach prewar levels before 1950. Meanwhile, European demand for imports will be unusually high judged by prewar standards, not only because of deficiencies in domestic production and the cleavage between eastern and central Europe, but also because of population growth.

World needs for imports of oils and fats in 1947 are about 14 billion pounds, 40 percent above the prewar import average. Export supplies available in surplus areas in 1947 are calculated at 6.3 billion pounds. Thus, the export supply available today is less than half the demand, based on physical needs and prewar patterns of consumption.

Many important producing areas have not yet resumed exports on their pre-war scale. These include the Netherlands Indies, Manchuria, India, French West Africa, and the Antarctic Ocean. Political unrest in the East Indies is holding back production and trade in palm oil and copra. Some copra is beginning to move from the outer islands of the East Indies. But virtually no palm oil is available for export from Sumatra and Java. Manchurian production of soybeans is reported to be down; and no Manchurian soybeans have appeared as yet in western trade.

Because of the rapid industrialization of India it is doubtful that that country will ever have an export balance in oilseeds and oils as large as before the war. Exports of oil-bearing materials and oils from India had been declining for many years; the decline has been more rapid in the past few years. Based on the physical needs of the people, India conceivably could become a large net importer of fats in the not-too-distant future.

Production of peanuts in West Africa was seriously reduced in the past year by lack of trade goods and other incentives for the native growers. Whaling operations in the Antarctic Ocean this season are held to about half the prewar level, chiefly by lack of whaling ships. Moreover, the present international agreement to conserve whales limits the total catch to about 60 percent of prewar.

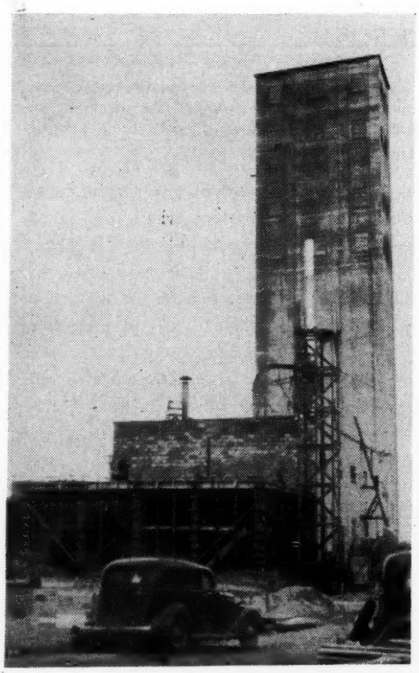
Expanded internal demands are restricting exports of oil-bearing materials and oils from Brazil and Argentina. Also, Argentina has just had two years of drought. Current supplies of flaxseed in that country are considerably below prewar.

The only bright spot in the present foreign supply situation is the rapid recovery of the Philippine copra industry. Copra production in the Philippines is above prewar. But the excess production is small compared with deficiencies in other areas.

The United States is participating in the international program to allocate scarce supplies of fats among importing countries. In 1946 the United States had a small net balance of imports for the first time since 1942. However, because of the limited supplies available and the urgent needs of Europe, our net balance of imports in 1947 may be only a fifth to a fourth of the prewar balance. The principal items imported will be copra, linseed oil, and castorbeans. The principal export item will be lard, with some soybean oil and soybean-oil products also being shipped.

Production of fats and oils in the United States in 1947 will be about 1 billion pounds above prewar, with soybean oil accounting for most of the gain. But net imports will be at least a billion pounds less. Moreover, our population is nearly 10 percent greater than prewar, and our stock position is unusually low.

If no allowance is made for increase in stocks this year, civilian consumption of visible fats in both food and nonfood products will amount to about 64 pounds per person compared with an average of 70 pounds in 1937-41. If stocks are restored in part toward normal working levels, consumption of fats per person in 1947 will be lower than in any of the war years. No relief in the short supply situation is likely before new crops reach the market next fall.



—Photo courtesy Strottgo Grainews

This is the new flax and soybean plant of Cargill, Inc., at Port Cargill, Savage, Minn.

POSSIBLE FUTURE DEVELOPMENTS

A substantial increase in domestic output of fats and oils is anticipated for the year beginning October 1947. Prices of soybeans, flaxseed, and hogs are now unusually high in relation to grain prices. Increased plantings of soybeans and flaxseed are likely this year. Also, the 1947 pig crop undoubtedly will be larger than that of 1946. Most of the fats and oils from these crops will become available in late 1947 and in the first 9 months of 1948. Prices will decline from the present abnormally high levels. But until world export supplies surpass those of the prewar years, prices are likely to stay well above the levels of the late 1930's.

The world's physical needs for oils and fats, based on prewar consumption standards, probably will not be fully met for four or five years. So the outlook for soybeans remains rather bright for that period. Over a longer period, soybeans will again face severe price competition from tropical oil-bearing materials. As a result of present shortages and high prices, palm-tree plantations are likely to be expanded in West Africa and perhaps South America during the next 10 years. Copra production in the southwest Pacific probably will exceed the prewar output. And peanut production in Africa will be pushed, in part to make up for the decline in exports of edible oilseeds from India.

Palm nuts and kernels of a number of varieties probably offer the greatest potentialities for long-term expansion. The yield of palm oil per acre is high for well-tended groves, and large tropical areas are available for expansion of groves. Farflung development of palm groves, however, will not come over night. During the 1920's extensive palm-tree plantations were established in the Netherlands Indies and in

Malaya. These trees did not come into full-bearing until the late 1930's, when oil prices were low. That experience may induce excessive caution in restoring the plantations in the Far East and in planting new developments in other areas. However, the world at present is greatly in need of vegetable oil. The palm tree offers a certain, though comparatively slow, means of producing vegetable oils in abundance.

Soybeans in the United States will face continual competition from domestically-produced corn. Soybean oil meal is usually considered as a source of protein to supplement corn in livestock feeding. But it has been observed that changes in prices of soybean cake and meal are closely related to changes in prices of corn. That is, when corn is abundant and relatively low priced, livestock feeders tend to use proportionately more corn in their feeding rations, thereby weakening the demand for soybean cake and meal. *The advantage of buying protein supplements in periods of low corn prices will have to be repeatedly and abundantly demonstrated to the farmer if soybean cake and meal is to reap the full benefit of its natural qualities as a high-protein feed.*

LONG TIME OUTLOOK

The outlook for soybeans over the next 10 or 15 years may be summarized as follows. First, during the next four or five years, the world supply of fats will continue below physical needs based on prewar standards. Also, the supply of livestock products in Europe will be comparatively low. There will be a strong European demand for soybean meal and soybeans, which will be supplied in part by the United States. But Manchurian soybeans may become a competitor within the next few years. That is uncertain, as the future trade policy for Manchuria is clouded by political disturbances.

Second, there will be a transitional period of another four or five years, when supplies of fats and protein meals will be in better balance with demands. Prices of soybeans will be below present high levels but above prewar.

Third, within 10 or 15 years world supplies of oil-bearing materials, and oils and fats, may become excessive if the probable expansion in plantation palm and other oilcrops occurs. Prices of soybeans at that time would be depressed. But whatever the price conditions, it is highly probable that large-scale production of soybeans in the United States is here to stay.

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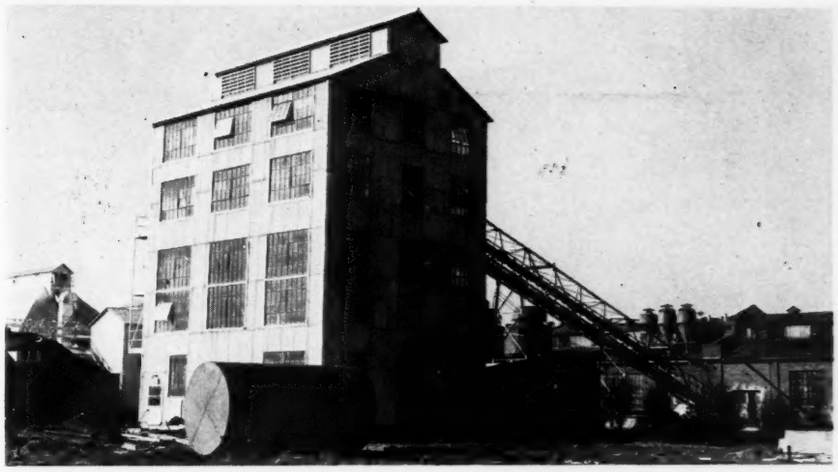
The Chinese national price commission has decided to limit exports on soybeans and other oilseeds and their oils to "balance supply and demand for these commodities," according to the Associated Press.



New Delta Products Co., solvent extraction plant at Wilson, Ark. The firm is a pioneer in the solvent extraction process on cottonseed.

FIRST SOLVENT PLANT IN SOUTH

By JANE INEZ GORDON

Oil milling moved into a new era in the South in early March, when the first full-scale continuous solvent extraction plant ever built for processing cottonseed began operations at the Delta Products Co., Wilson, Ark., leading the field in the conversion from hydraulic presses to chemicals. All phases of the extraction process on cottonseed were successfully developed in an Allis-Chalmers pilot plant at Wilson, Ark.

Following closely on the heels of the Delta Mill, the new solvent extraction plant of the Buckeye Cotton Oil Co., Memphis began operations on soybeans, but will recover cottonseed oil in the same plant in the near future, for which it was built. This plant has incorporated the "basket-type" extractor, and is virtually the same process as is in use at the Buckeye Soybean Mill, Louisville, Ky.

Other cottonseed oil mills converting to the solvent recovery method are Helena Cotton Oil Mill, Helena, Ark., and Osceola Products Co., Osceola, Ark., which will be of the Allis-Chalmers design. Completion of these plants is expected within the next few months.

A large size solvent extraction pilot plant of the Bonotto system is under construction at the Swift & Co. Oil Mill, Memphis for cottonseed. The plant is being erected by the Production Engineering Co.

For the first time in the South, the solvent extraction method will be used for the recovery of oil in soybean plants. Under construction is an Allis-Chalmers plant at the Wilson Soybean Mill, Wilson, Ark., which is owned by the Delta Products interests. The West Tennessee Soya Mill, Tiptonville, Tenn., whose plant recently burned is being rebuilt with an Allis-Chalmers solvent plant. The Buckeye Cotton Oil Co. is completing a solvent plant for soybeans at New Madrid, Mo.

Other conversions are expected to follow as soon as materials and equipment are available, although the change is not expected to be a dramatic change-over, but a gradual one.

C. W. Hoover, manager, Delta Products Co. Wilson, the acknowledged pioneer for this new method for cottonseed oil recovery, has shown generosity and willingness to share the findings of experiments at his mill on the pilot plant with other members of the industry. During the year of experiments, interested groups from all parts of the country came to watch and discuss the demonstrations.

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DELPHOS CO. TO INCREASE OUTPUT

Work has begun on the postwar expansion program of the Delphos Grain & Milling Co., Delphos, Ohio, which will include tripling its storage capacity and increasing soybean processing capacity 50 percent.

The firm is starting the foundation for 17 additional storage tanks with a total capacity of 500,000 bushels. Present storage capacity is 250,000 bushels.

Machinery is being placed in the soybean plant to increase the product by 50 percent, or up to 1 million bushels of soybeans yearly.

Delphos Grain & Milling Co. began operations 3 years ago with three employees. At present there are 30 employees, and this number will be increased to 40 with the completion of the expansion program this fall.

—USDA Photo by Killian

Purebred Herefords on a Bel Air, Md., farm

Soybean Oil Meal Important In U. S. Beef Production

By D. W. SIMONSEN
Soybean Research Council

THE VARIOUS stages of the production of beef in the United States have, to a large extent, become specialized in certain areas due to the special advantages of crops, climate, and cheap grass.

In the far western semi-arid plains and the foothills of the Rockies the cowherds are maintained and calf production is a major part of the livestock business. In this area some of the calves are grown to yearlings and 2-year-olds.

Just to the east of this area we find sections with especially good pastures where calves are wintered on native hay, native pastures with tall growth, and on wheat pastures. During the following summer the young cattle are allowed to grow on the native pastures.

To the east of this great pasture area we find the Cornbelt where the fattening and finishing of the western animal is completed.

In all these sections and in all the various stages of the production of beef we find that soybean oil meal has been found to be a necessary and most economical protein rich concentrate to supplement the native grasses and grains.

Recent work at the Nebraska Station[1] has shown that the addition of ½ pound soybean oil meal daily to the winter ration of steer calves on a prairie hay diet increased the beef produced per acre of hay production from 74 pounds to 175 pounds. In this instance 86 pounds of soybean oil meal produced an additional 101 pounds of beef. When fed at the rate of 1 pound per steer daily, 168 pounds of soybean oil meal increased the beef production per acre of hayland by 144 pounds.

With another type of hay where 47 pounds gain was obtained without supplement, soybean oil meal at the rate of ½ pound daily increased the gain to 113 pounds, and when 1 pound per head daily was fed, 213 pounds soybean oil meal increased the gain to 232 pounds.

On the basis of average daily gain, with prairie hay cut in July and fed without supplement, 0.4 pound of gain was obtained. One-half pound daily feed of soybean oil meal increased the rate of gain to 1.01 pounds, and 1 pound of soybean oil meal daily increased the gain per day to 1.3 pounds. For August cut hay the figures are respectively a gain of 0.2 pounds with no supplement, 0.52 pounds when ½ pound of soybean oil meal was added, and 1.09 pounds when 1 pound of supplement was added daily. For September cut hay unsupplemented the calves lost 0.17 pounds daily, and with ½ pound soybean oil meal in ration gained 0.39 pounds, and with 1 pound added the gain reach 0.79 pounds.

From the above figures it will be noted that 1 pound of soybean oil meal produced from 0.56 to 1.17 pounds of beef.

For the finishing of the beef animal in the Cornbelt, the use of soybean oil meal has become general only in the last 10 years. A great many experiments have been completed by the various state experiment stations on the relative merits of soybean oil meal.

The Purdue Agricultural Experiment Station has reported steer feeding trials in which steers were fed shelled corn, silage, clover hay, and salt. One lot of steers received as a protein supplement 1½ pounds cottonseed meal daily, and another lot received 1½ pounds soybean oil meal, while a third lot received ¾ pounds soybean oil meal daily. The steers receiving the 1½ pounds soybean oil meal returned $8.27 more per head profit than those receiving 1½ pounds cottonseed meal. The lot receiving the ¾ pounds daily of soybean oil meal returned $4.92 over the cottonseed meal fed steers.

An important factor in the successful feeding of soybean oil meal arises from its palatability. Soybean oil meal is very well liked by all animals, and when fed to beef animals it is essential that it be mixed with the other feed to prevent one steer from consuming an extraordinarily large amount.

It is the writer's opinion that, in the few cases where soybean oil meal has found disfavor among livestock feeders, it is due primarily to over-eating, either by a few steers in the lot, or by the entire herd receiving more soybean oil meal than is required to properly balance the ration.

New experiments by our agricultural colleges, and the widening experience of stockmen are showing more clearly each year the important place soybean oil meal has in this nation's beef production.

—s b d—

1 M. L. Baker, professor of animal husbandry, University of Nebraska, Lincoln, in a personal letter.

AS BEE FEED

In order to test the value of soy flour as a substitute for pollen in bee feeding under Australian conditions, a quantity of low fat flour has been imported into Australia from the U. S. The importation was sponsored by apiarists associations and approved by the Australian government.

"It should prove a valuable asset to the bee-farming industry," states the *Agricultural Gazette.*

STATUS OF THE SOYBEAN

PROCESSING INDUSTRY *Today*

By D. J. BUNNELL

Vice President Central Soya Co., Inc.

• From a speech at the Soybean Conference at Peoria, Ill., in February. Mr. Bunnell stresses the importance of more orderly soybean marketing. Since there is a spread of average price from November to June of over 20c per bushel over a 20-year period, according to USDA figures, it should be profitable for the grower to store more soybeans on the farm.

IN THAT decade of the 1930's, while the country was staggering under the influence of agricultural over-production, there was at first a gradual and then an accelerated increase in soybean acreage. Soybeans were being established as an important crop, to be sold to market. It was a benefit to Cornbelt farmers to plant part of their land to a cash crop which did not add to their surplus problems. Through these years, expansion of plant facilities continually kept ahead of this soybean production trend. Up to the war there never was a soybean crop sufficiently large to keep processing plants busy 12 months of the year. At the end of each crop year most units in the industry were closed down. A child of the depression, the soybean provided a means for land use which gave the farmer a badly needed cash crop with a waiting, expanding market.

A great deal of the early expansion of the soybean industry was provided by organizations already well established in other fields of operation, to whom either the protein or the oil from the soybean had application in their particular field of activity. Organizations interested in the mixed feed business began to establish soybean processing plants, and others who used soybean oil, either for edible or industrial purposes, did likewise.

The first solvent extraction plants in America were built in this period of the 1930's. However, most of the increase of crushing facilities was largely of the conventional expeller type equipment. The necessity of this rapid expansion, on the part of a new industry, is better understood by reference to production figures.

In 1930 the total soybean crop grown in the United States amounted to 13,929,000 bushels compared to 90,141,000 bushels in 1939. Then, from increased acreage—because of drought conditions over part of the belt—production in 1940 dropped to 77,468,000 bushels. Further increased acreage with more normal weather conditions in 1941 made possible the largest prewar production of 105,587,000 bushels.

The war made necessary 5 years of large production—1942 through 1946. Actually, production never quite reached 200 million bushels in any one year; but, during this period, the soybean crop was so near the 200-million bushel figure that this term was frequently used to describe its size.

The industry's 1941 plant facilities were enlarged very rapidly to keep abreast of wartime production initiated by the government program because of the need for fats and oils. Now that the war is over, other considerations have continued to give impetus to the further expansion of improved facilities. Today there is an estimated annual plant capacity in the industry of 170 million bushels. With the addition of plants under construction and contemplated plans which shall go forward as soon as equipment manufacturers can make deliveries, this plant capacity will be raised very close to 185 million bushels. Ability to handle and process the soybean crops likely to be raised in the years immediately ahead is not a problem. The soybean processing industry is now geared to meet the requirements of even a larger crop than has ever been harvested in any one year.

Can the industry handle the product output from crops within the range and even exceeding a 200 million bushel volume? This question cannot be answered without conjecture. We must be guided by our present knowledge of world supply and demand as it fits into our domestic picture. Fats and oils are still in short supply. It is safe to assume that it will be another year, maybe 2, before the production of oils will have caught up with consuming needs over the world. Hence, we may further assume there is need for oil exceeding the output from a 200 million bushel crop. This anticipated demand is for an oil of a quality superior to that which was produced in the early 1930's. Today's production, much of which is thoroughly settled or degummed, is certainly a greatly improved product compared with the soybean oil you tested in your laboratories in the early 1930's.

The broad demand for soybean oil comes from all classes of users. Improved know-

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ledge of soybean oil in the edible trade has permanently increased its use in many food products. Increased quantities are beginning to go into the industrial field. The paint industry is looking toward soybean oil to play an important role as one of the groups of oil that represent their raw material. Much has been learned in recent years about the fractionation of oils for drying purposes. As commercially feasible methods continue to be worked out, there will be a rapidly increased application of the very desirable soy oil fraction to specific uses in both the industrial and edible fields. This development is only one of several which will continue to widen the market for soybean oil.

Cottonseed oil—the other important domestic vegetable oil—is strictly a by-product of the cotton crop. There may be an increased cotton acreage for a year or 2, but this crop is limited to the need for cotton. There is still a sizeable carryover that puts a definite limitation on how much should be produced. Diversification of land use in the South has already started a new economic era in the Cottonbelt. These conditions strengthen my belief that soybean oil will continue to hold its leading position as a domestic vegetable oil.

The world supply situation, as it applies to fats and oils, has been out of balance for 5 years. The surplus oil producing areas cannot come back quickly. Again in the realm of conjecture, it would seem to me, in view of the needs of Europe and East Asia—on one hand—and the time that must be consumed to get surplus countries into production—on the other—2 and maybe 3 years shall elapse before dependable imports will be channeled again to this country.

One of the big problems to be faced in respect to the grind from a 200 million bushel soybean crop is the distribution of soybean oil meal from such a crop. Farmers have learned more about the value of protein in feeding livestock and poultry during the war years than in any comparable period before. The economy that can be gained in the proper balance of protein with carbohydrate grains is an indisputable fact just beginning to have proper recognition from all classes of feeders. Education is a slow process. There is a great economic waste when an animal is required to eat through a certain amount of corn necessary to provide the growth factors when that same growth can be obtained by feeding about half the quantity of corn with the proper balance of protein.

NEVER PROTEIN ENOUGH

This country has never produced enough protein to supply the quantity needed to provide the most economic balance with carbohydrate grains. In the last 10 years the protein content of corn has dropped from about 9.5 percent to about 8.5 percent. These figures are taken from hundreds of cars of corn adjusted to a 15 percent moisture basis. No attempt is made to explain the progressive drop in protein content of corn because of open pollinated versus hybrid, weather or soil. The drop in the protein content of corn has occurred. It is of great concern to the farmer, and the proper use of protein concentrates is more important than ever before. There is need for all the protein from a 200 million bushel soybean crop in the livestock and poultry industries alone.

Soy flour is a concentrated food that has many applications for human use. It also is used for industrial purposes where high protein content gives desirable results. The proper recognition for this product has been slow; but the scope of its use is becoming wider each year. The industry is becoming organized to produce many types of soy flour for specific uses which will gain recognition in several fields of distribution. The volume has never been large, as compared to soybean oil meal, but this product will receive greater consumer acceptance as educational programs take effect.

Basically, soy flour is a problem of exploring all the possible channels of distribution combined with an effective program of education. In time, soy flour will become a product of important volume in the industry.

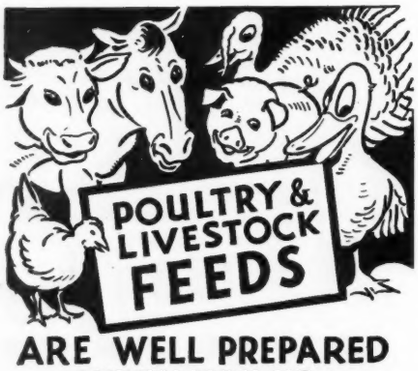
SOYBEANS IN ROTATION

No industry can be healthy unless it has a dependable source of supply of raw material from year to year. The farmer will not continue to raise soybeans in quantity if he cannot be convinced it is to his benefit to raise the crop. This is one of the major problems before our industry today. In the last few years, much has been said against soybeans as a crop. Many unfair accusations have been made against soybeans.

In an effort to be brief, I shall only remark that all crops take something away from the soil. The manner in which the crop is handled will determine its effect upon the soil. In a proper appraisal of the total effect of soybeans on the soil, it is apparent that the soybean is not "hard on the soil" when compared with other Cornbelt crops such as corn and small grains.

Much may be said of the beneficial influences resulting from the soybean crop. Properly planted in the rotation, it fills a needed place in the agricultural plan of Midwestern farms. A better balanced acreage is essential to maintain consistent, fair return from the cash crops sent to market. Burdensome surpluses must be avoided. Today, with heavy production per acre from hybrid corn and improved varieties of oats, there is great danger of piling up surpluses which will have disastrous consequences on the farmer's earning power. Here is a crop which should be properly planned in the rotation to give the balance that will insure a margin of safety to the price structure of other cash crops.

Since the soybean is a combine-harvested crop, accumulation is extremely rapid. In the fall of the year, when operations get under way, there is a rush to market of many millions of bushels in a very short period of time. Last fall, in 6 to 8 weeks, 120 million bushels left farmers' hands. Sixty percent of a crop is far too great a proportion to be absorbed in an orderly



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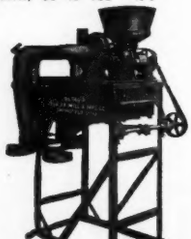
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manner in so short a time. At $3 per bushel, 120 million bushels represents an outlay of 360 million dollars. You cannot realize how disproportionate a percentage this represents unless it is translated into terms of other crops. Compared to corn, a crop that is not a true cash crop for only 20 percent moves from the farm, 400 million bushels—representing a value of approximately 500 million dollars—would have to be moved in the 6 to 8 weeks' period to be comparable. Compared on the same basis, wheat would present the astounding total of 690 million bushels with a value of $1,330,000,000. Under normal conditions the result would be a depressing influence on price, even though there was a definite need throughout the year for the products.

Later in the year, when the pressure of heavy movement is over and prices go back to better levels, farmers become disgruntled, not realizing it was poor marketing in the first place that depressed prices unduely. The industry is forced to borrow huge sums of money to finance this heavy movement. Bankers who provide the money want to know if the processor is protected. The processor finds his protection in sales of products; hence presses his customers for sales of oil and meal. If sales cannot be made at one price, there is a tendency to reduce quotations to a level that will result in business.

MARKET TROUBLES

This is a vicious circle. The farmer forces his soybeans on a glutted market and the processor scrambles to get sales of oil and meal in future positions to provide protection against purchases.

A good soybean futures' market will be of great benefit and shall give some relief. But the farmer should be more practical in his merchandising of the crop. A larger percentage of the crop ought to be held back on the farm to be sold in an orderly manner throughout the year. The soybean industry is sincere in the viewpoint that the farmer ought to receive as good a price as possible—a price commensurate with market conditions.

Best prices cannot result from disorderly marketing. The processor must be able to acquire a good working inventory that will protect his operations several months ahead. This guarantees a continuous grind necessary to the efficient conduct of a business. Therefore, the industry is prepared to take a good run of soybeans during the harvest period. However, in recent years, the fall movement has been out of all proportion to the physical ability of processors to handle the rush. The farmer will serve his own interests best if he spreads his selling more through the year.

Throughout the soybean industry there are plants of different types, serving different purposes, with operations that have a wide range of size. The larger expeller plants have from 10 up to 40 expellers in a single operation. Expeller equipment is very well adapted to small plant units. Especially during the war has there been a marked increase in the small plants employing from one to four expellers. Today the combined volume of these small plants represents a very noticeable percentage of the industry's crush.

Solvent extraction plants range from large units, handling 500 tons or about 16,500 bushels, per day, down to below 50 bushels a day. There continues to be a tendency for further increase in the solvent extraction capacity in the industry. This is easily understood because the value of the oil fraction gives an incentive to improve efficiency along this line. Very careful supervision with absolute controls has reduced hazards to the very minimum. In fact, insurance companies have had greater losses to pay on expeller plants in the last 10 years than on solvent extraction plants.

Increased knowledge of the fundamentals of the solvent extraction system in the last 5 years has improved efficiency of operation. Proper moisture levels, better hull aspirating methods and improved handling of flakes through the system have lowered solvent losses, increased oil yields, and limited the fines in the miscellas. Much is still to be learned. It is the kind of an operation that is difficult to use experimentally. For this reason our own organization has installed a small laboratory size solvent extraction unit. This will enable us to try out quite a number of

Concerning Speculation

"Speculation . . . is the self-adjustment of society to the probable. Its value is well-known as a means of avoiding or mitigating catastrophes, equalizing prices and providing for periods of want. It is true that the success of the strong induces imitation by the weak, and that incompetent persons bring themselves to ruin by undertaking to speculate in their turn. But legislatures and courts generally have recognized that the natural evolutions of a complex society are to be touched only with a very cautious hand . . ."

MR. JUSTICE HOLMES
May 8, 1905 *United States Supreme Court*

As Justice Holmes observes, speculation does play a vital role in the commodity markets. However, this firm has always maintained it should be undertaken only by those who have sufficient resources and a sound knowledge of the markets. It is our business to help traders implement their knowledge in this field by supplying essential facts and figures. If we can be of any help, we'll be happy to oblige.

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things we have in mind that would probably never be attempted in a large plant operation. In the end there shall be obtained some answers that will make this effort worth while.

There has been a definite improvement in plant operations throughout the industry, during the war period. This applies to both solvent extraction and expeller operations. Increased production has been followed by better oil yields and improved quality of both the oil and the meal. Better settling and filtration methods on one side have been equalled on the other through better controls and improved toasting methods which have resulted in a soybean meal of increased nutritional value.

Many soybean processing companies have well equipped research laboratories thoroughly staffed with recognized competent technicians. Investigations are being made for the improvement of products now under production. Research is being conducted to develop new products and to find their proper commercial application. Pilot plants have been brought into existence to assist in the final stage of this important work. These endeavors are very closely related to the valuable work being carried out by the government research laboratories.

Under the war program, the industry has operated at peak capacity. There has been excessive wear and tear on all facilities and equipment. Expensive rehabilitation has started, and in some instances complete replacements will be made to bring efficiency to the desired level. Here and there some inefficient units will be compelled to stop operations in the competitive period ahead. Progress will continue to guide the destiny of soybean processors. Each plant must be developed into a modern, economical enterprise. This is true regardless of size or type of operation, and must be planned to fit into the problems of the area it serves. In the end, there shall remain those who operate with the highest mechanical efficiency combined with the most economical methods of distribution.

Do not be too dogmatic about saying that extraction plants are going to entirely replace expeller plants. An extraction plant lends itself to a large scale, carefully supervised operation while the small, well managed expeller plant can establish direct trading relations with the country on both soybeans and soybean meal. Direct methods of trading will enable these plants to continue active in a very competitive situation.

The future and well-being of the soybean industry are inseparably connected with the future and well-being of American agriculture. The welfare of the nation is so closely related to the welfare of agriculture that it is the avowed natural policy to keep agricultural prosperity on a high level. The soybean industry looks to the future with confidence for its interests are identical with the interests of agriculture.

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CORN-SOYA CEREAL

Texas and Florida have been chosen as the starting points for an introductory campaign for W. K. Kellogg's new breakfast cereal, Corn-Soya, reports *Food Field Reporter.*

Sampling, dealer service and advertising are under way in the two areas. Previously tested markets were Harrisburg, Pa.; Charlotte, N. C.; Sioux City, Iowa; and Sacramento, Calif.

The drives under way now in Texas and Florida are the beginning of the "big push" to put Corn-Soya on a national distribution basis.

Kellogg became interested in nutritional value of the soybean following the last war. The correct variety of edible soybean was found and also a secret blend with corn that "just hits the bull's eye," according to the cereal firm.

Corn, company officials say, yields more food energy per acre than any other staple farm product while soybeans produce the largest amount of digestible proteins at lowest cost of any staple farm product.

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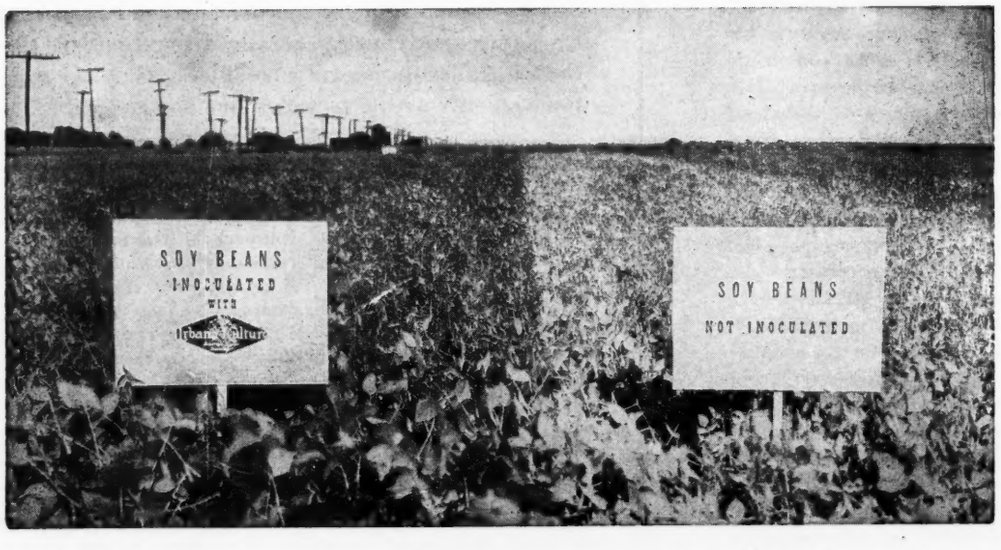

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No. 427—The most convenient carbon tetrachloride type of fire extinguisher on the market. Turn handle a half turn either way. Pump a few strokes, pull the trigger, and the "Pistol-Grip" shoots about 30 feet. All metal parts are either brass or copper. Corrosion is impossible. Liquid contains no water, alkali, or acid, and will not freeze. Non-conductor of electricity. Will not harm machinery, fabrics or other materials. 1 quart size $9.30; 1½ quart size $11.30; 1 quart can refill liquid, $.95; 1 gallon can refill liquid, $3.15.

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Advanced type Extinguisher has two vitally important fire fighting features. (1) Range from 30 to 40 feet; (2) A constant spray that effectively reaches the fire area. In addition to the straight stream, a spray may be made by simply thumbing nozzle. It is a self-contained unit and can be readily transported up ladders, over roofs and to points difficult of access. Interior has a corrosion-resistant coating.

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Soda and Acid

Popular for fighting Class A-1 fires—wood, paper, textiles, rubbish, etc. Operates by simply inverting. Throws a stream approximately 40 feet and will discharge for about 60 seconds. No parts to corrode or get out of order. Tested to 350 lbs. This extinguisher must be protected from freezing. Made of highly polished copper finish.

No. 507—2½ gallon..$16.50

Foam Type

Recommended for Class A-1 and Class B-1 fires—inflammable liquids, grease, oil, etc., as well as wood, paper, textiles, rubbish, fires, etc. Operates by simply inverting. Throws a stream approximately 40 ft. and will discharge for about 60 seconds. Will not corrode. Must be protected from freezing. Made of highly polished copper.

No. 502—20 gallon foam blanker. $18.50

AUTOMATIC—Wall Type

Provides day and night automatic fire protection. When the fire brings the temperature up to around 160° a fuse melts, releases a powerful coiled spring, crashes heavy metal slug against the thin glass bulb or grenade, instantly shatters it—scattering the fluid which runs out through holes. This fluid changes into fog and forms fire smothering blanket. The blanket shuts off oxygen and smothers the fire. For use in mills, plants, warehouses, etc.

No. 460—Regular automatic standard size $4.95

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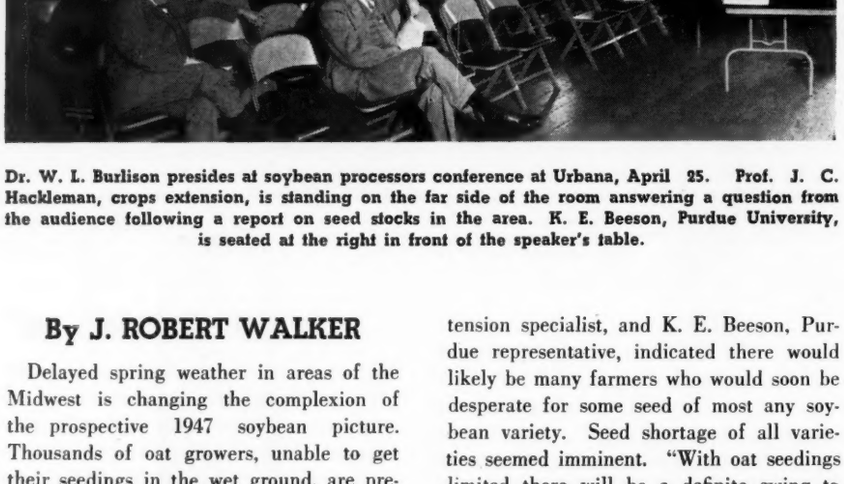
PROCESSORS MEET AT URBANA



Dr. W. L. Burlison presides at soybean processors conference at Urbana, April 25. Prof. J. C. Hackleman, crops extension, is standing on the far side of the room answering a question from the audience following a report on seed stocks in the area. K. E. Beeson, Purdue University, is seated at the right in front of the speaker's table.

By J. ROBERT WALKER

Delayed spring weather in areas of the Midwest is changing the complexion of the prospective 1947 soybean picture. Thousands of oat growers, unable to get their seedings in the wet ground, are predicted to be on the verge of changing their cropping patterns to include beans or corn instead of oats in this year's production scheme.

This seems to have been the opinion of many college extension men and soybean processors as they convened on the campus of the University of Illinois, Urbana, on April 25.

The meeting was held under the joint auspices of the Colleges of Agriculture at the University of Illinois and Purdue University with soybean processors of the two states cooperating.

Under the chairmanship of Dr. W. L. Burlison, Illinois agronomy department head and past president of the American Soybean Association, the program presented reviews of cultural developments, storage problems, and reports on research by experiment station and regional laboratory workers.

Both J. C. Hackleman, Illinois crops extension specialist, and K. E. Beeson, Purdue representative, indicated there would likely be many farmers who would soon be desperate for some seed of most any soybean variety. Seed shortage of all varieties seemed imminent. "With oat seedings limited there will be a definite swing to soybeans, and seed supplies will be quickly absorbed," Hackleman declared.

He referred to a recent survey among soybean growers in 21 Illinois counties. Of the near-thousand replies, 88 percent of the growers had their own seed available for 1947; 25 percent of them had extra seed available; and 11 percent indicated that insufficient seed was available.

A survey reported by J. W. Calland, director of agronomic research, Central Soya Co., Decatur, Ind., revealed figures closely aligned with Hackleman's report. His survey disclosed that of the varieties to be planted this year Lincoln variety will be sown on about 84 percent of the intended acreage. Nearest competitors were Richland and Illini varieties each with about 5 percent of the intended acreage.

The soybean improvement program of the U. S. Regional Soybean Laboratory was explained by J. L. Cartter, director. Processors heard of the laboratory's cooperative programs with the 24 agricultural experiment stations in the North Central and Southern regions. Dr. Cartter referred to the Uniform Soybean Tests that have been established cooperatively in about 44 locations in the North Central States and 52 locations in the South. He said that by growing strains in these nurseries at many locations in a region it has been possible to evaluate such strains in a relatively short time. "As a result of this cooperative work, we have a number of very promising strains under test in the Uniform Nurseries," the director stated.

Dr. Cartter added that the establishment of an analytical section in the laboratory has made it possible to select soybean strains for chemical, as well as agronomic value, which enhances the breeding program.

DISEASE INCREASE

The development, expansion and continued cultivation of all crops has resulted in increased diseased losses of those crops, said Dr. W. B. Allington, plant pathologist with the regional laboratory. "Losses from disease are only now beginning to be felt with the soybean crop." Dr. Allington observed that processors did not have, and will not have, complete assurance that trouble is not ahead. He added "we do not have the necessary techniques in practice for plant disease control which would enable us to give you such assurance."

The plant pathologist disclosed that approximately 1,200 soybean varieties and introductions would be tested this year for resistance to the serious virus disease, Bud Blight. The disease was very serious in many fields in southern Illinois and Indiana in 1946. If infection occurs before blossoming, the plants usually produce no seed. Infection soon after blossoming causes many of the pods to be blighted. Plants infected at both times fail to ripen normally; and if seed is produced, much of it is of very poor quality.

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Another serious disease is the Brown Stem Rot, the control of which appears at present to be possible by following a 4-year rotation. The disease, caused by a soil-borne fungus, was first observed in the 1944 crop of Illinois soybeans. The disease has grown progressively more serious in the last 2 years, and in 1946 it was present in epidemic proportions in 30 percent of the fields in central Illinois and Indiana.

"It has been a general observation, thus far, in searches for disease resistance in soybeans to find practically everything moderately susceptible," Dr. Allington said. "It has become apparent that in breeding for disease resistance we must also take into account the breeding program carried on in nature by the parasites themselves. New strains of the parasites are continually being produced, some of which may be more virulent than the older types.

"Probably the explanation for sudden increase in severity of old diseases or the appearance of entirely new diseases is based on this phenomenon."

MARKET PROBLEM

Deane G. Carter, professor of farm structures in the agricultural engineering department at the University of Illinois, pointed out that farm storage of soybeans is one solution to the problem of orderly marketing. He spoke to the group on the various factors affecting the quality of soybeans in farm storage. A summary of cooperative research between the Illinois station and the U. S. Department of Agriculture was reported as follows:

No reduction in oil content of soybeans was found as a result of storage.

Little increase in fat acidity was noted after 28 months of storage at 9 percent moisture; however, 12 percent moisture in the beans showed an average acid number of 2 to 2.5 at the end of 28 months.

Low moisture beans (8-9 percent) showed only a slight loss in germination after 28 months; but 12 percent moisture in beans decreased germination so as to be unsatisfactory for seed.

Little or no trouble with insects was encountered. With normal storage conditions, few insects are in evidence.

Storage temperature might be an important factor at the upper limits of moisture in warm weather. Relatively low temperatures do decrease the likelihood of heating, molding, and loss of germination, and yet these factors are more closely related to moisture than to temperature.

Unfavorable moisture conditions are the source of most troubles in farm storage.

For short time with cool weather storage, no ill effects have been noted at moistures of 13 to 14 percent.

For 1 year in storage, moistures of 12 percent or less appear to be safe.

For seed storage, the limit is 12 percent moisture or less for one season and 9 percent for longer than 1 year.

For long-time storage, 12 percent moisture gave little trouble for 34 months. At 9 percent moisture, there was no important reduction in quality after 3 years.

—s b d—

100th ANNIVERSARY

In celebration of its 100th anniversary, the Massey-Harris Co. held open house at the Racine plant for representatives of the press on April 14th.

A large delegation of farm paper and magazine men spent a busy and highly enjoyable day, features of the program including an inspection of production methods, and the introduction of new numbers in the Massey-Harris implement line.

A new corn picker is included in the 1947 line; so is an improved combine and new tillage implements. Massey-Harris was the first of the farm implement companies to manufacture a combine for use on soybeans; and has ranked among the leaders in the production of equipment for growing soybeans.

The company started in 1847, when Daniel Massey produced a mowing machine in his blacksmith shop in Brantford, Ont. A replica of the original mower was on display at the anniversary celebration.

A series of open house gatherings is being held by the firm during the anniversary year—one day for dealers, another for the press, another for the families of employees, another for townsfolk in Racine, and so on.

Round Trip to the Moon

● A ton of freight to the moon and back! That's one good way to measure the freight moved by American railroads in 1946 for *each* of the men and women on the railroads' payroll.

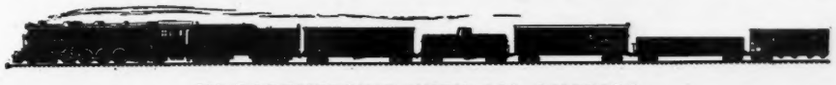
Working alone—with his bare hands—each one of these railroaders would have accomplished little. But working together and equipped with the right tools—cars and locomotives, tracks and stations, signals and shops—the immense job was handled efficiently and dependably. And it was done at a cost to the nation's shippers averaging only one cent for hauling a ton one mile.

To provide these essential tools, there has been invested nearly $20,000 per worker, furnished almost wholly by private funds. To improve these tools, there must be still more investment—which cannot be expected to continue unless railroads have a chance to earn reasonable profits on these funds.

But during the past twenty-five years—through boom years, depression years and war years—the railroads have averaged a return on their net investment of only 3¼%.

In 1947, even with the increased rates recently authorized by the Interstate Commerce Commission and with freight traffic continuing at its record-breaking peacetime level, railroads will probably earn only about half the 6% return which nine out of ten people think is no more than a fair profit, and which is necessary to attract continued investment in these essential railroads.

ASSOCIATION OF **AMERICAN RAILROADS** WASHINGTON 6, D. C.



IN PARTNERSHIP WITH ALL AMERICA

THE SOYBEAN OUTLOOK IN 1947

By J. W. CALLAND

Director of Agronomic Research
Central Soya Co., Inc., Decatur, Ind.
Presented at Farm and Home Week,
Ohio State University

We have been attempting to find out from the soybean growers of northwestern Ohio how they grow their soybeans; and we have been trying to evaluate the effect of some of their cultural practices on yields.

Our surveys have been conducted in cooperation with the agronomy and extension departments of Ohio State University.

Two years ago 1,500 growers in 18 counties answered the questionnaires telling how they grew the 1944 crop, and their intentions for 1945. A year ago I reported their answers to you.* This year some 1,400 growers in 16 counties have answered similar questionnaires on how they grew their 1946 crop and their intentions for 1947. We now have enough information from these two sets of questionnaires to enable us to point out some things which we think may interest you.

These farmers had an average of 33 acres in soybeans in 1944, 33 acres in soybeans in 1946, and intend to plant 34 acres in soybeans in 1947. This indicates that the soybean crop has a regular place in their farming scheme.

Nine percent of their soybeans were planted in rows in 1944, 16 percent in 1945, 20 percent in 1946, and they intend to plant 26 percent in rows this year.

Here we have a definite trend toward increased row planting. We believe there are some good reasons why this trend will continue. They used 1.9 bushels of seed per acre for solid planting and 1 bushel for row planting. The increased yield of row plantings over solid plantings was 1.4 bushels in 1944, and was 3 bushels in 1946. Row beans usually are cleaner and can be combined earlier, leaving less straw to interfere with the seeding of small grain.

Using today's price of $4 a bushel, just the saving in seed plus the gain in yield for row beans over solid beans amounts to around $12 per acre. This looks like a good year to plant soybeans in rows.

Cultivating soybeans that are planted solid is not a popular pastime in Ohio. Only 34 percent of the solid beans were cultivated in 1944 and but 40 percent in 1946. Sixty-five percent of the solid fields that were cultivated received one cultivation, 30 percent were cultivated twice. The average increase in yield for cultivating solid beans was 1.25 bushels per acre. At present prices it appears that *a day spent with the rotary hoe or harrow on the average soybean field in northwestern Ohio would be worth about $160. It would seem that a trend toward cultivating solid soybeans might be in order.*

Probably no single factor has influenced the outlook for soybeans more than the work of the plant breeders and other scientists at our experimental stations and agricultural colleges. They have produced for the soybean grower definitely improved varieties. Also, extension workers have done an excellent job in most cases in getting information about these better varieties into the hands of the farmers. Nor should we overlook the fact that farmers have been prompt in adopting improved varieties.

The outstanding new variety, of course, has been the Lincoln. In 1944 Lincoln occupied 1 percent of the soybean acres in northwestern Ohio, 16 percent in 1945, 51 percent in 1946, and growers in 16 of the principal soybean counties say it will occupy 58 percent of their acres in 1947. In 1944 Ohio growers reported that only half of their soybeans were varieties recommended by the university and experiment station. Now, however, they intend to plant about 80 percent of their 1947 acres to three recommended varieties—Lincoln, Richland, and Earlyana.

There are good reasons for this definite trend toward planting improved varieties. Ohio farmers report that on the average Lincoln has given about 3 bushels better yield than the average yield of their other varieties. With 51 percent of the acreage in Lincoln this represents 1,350,000 extra bushels of beans, which, even at $3 a bushel, is quite an item to credit back to the research and extension workers of your university and experiment station.

VARIETIES AND ROW PLANTING

It is apparent from the reports of these growers that some varieties respond better to row planting than do others. One-third of the Lincoln acreage was planted in rows and produced 2½ bushels more beans per acre than did the Lincoln acreage that was planted solid. Earlyana in rows gave an increase of 1½ bushels. There was no increase for Richland when planted in rows.

Records on the 1944 crop show a gain of almost 4 bushels per acre for narrow rows over corn-planter-width rows. This gain was only 1 bushel in 1946. Apparently the explanation for this difference in gain is the fact that in 1946 80 percent of all the acres planted in rows was planted to Lincoln, which is much better adapted to wide rows than were the varieties planted in rows in 1944.

The crops reported by these growers as preceding and following their soybeans indicated that in 1944 about 50 percent were using a crop sequence of corn, soybeans, small grain. Last year's reports indicate that corn precedes soybeans in 62 percent of the fields and that soybeans are followed by small grain in 74 percent of the fields. Eighty percent of the growers inoculate their soybeans and only 15 out of 1,385 are growing soybeans for 3 years on the same field.

* See Soybean Digest, April, 1946, page 14-16.

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NEW YORK MEMPHIS DALLAS SAN FRANCISCO

There was little difference in yield for soybeans planted from May first to the middle of June, but there was a definite decrease in yield for fields planted the last 2 weeks of June, particularly in 1946. It is true that the variety planted and the weather that follows the planting will frequently influence yields more than will the planting date. But it is also true that higher yields can be expected from early plantings of midseason and later maturing varieties.

Twenty percent of the growers applied commercial fertilizer to their soybeans in 1944, 23 percent in 1946. Seventy percent of the fertilizer was put in the row, 21 percent broadcast, and 9 percent plowed down. Fifty percent of the growers said the fertilizer gave good results, 14 percent said it did not, and the other 36 percent said they didn't know.

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BOOKS

NEW RICHES FROM THE SOIL—THE PROGRESS OF CHEMURGY. By Wheeler McMillen, president of the National Farm Chemurgic Council, Inc., and editor-in-chief of *Farm Journal*. 397 pages. Price $3.00. D. Van Nostrand Co., Inc. New York.

This is the story of chemurgy and the National Farm Chemurgic Council by the man who has led the parade. McMillen says he became convinced 20 years ago that "mere law-passing could never assure a stable and prosperous American agriculture." Since then he has sought to make generally available the ideas of chemurgy, which he believes may accomplish that aim.

"Chemurgy may be accurately defined," the author states, "as a concept devoted to advancing, through applied science, the development of new industrial uses for farm-grown materials, and the establishment of new farm crops."

A full chapter is devoted to soybeans. The spectacular rise of the crop was well promoted and has been commented on by many writers. But McMillen notes a fundamental fact back of the expansion: neither the U. S. nor the world has ever produced as much of either protein or vegetable oils as the people want. The soybean is one of the world's best sources of both oil and protein.

The author tells of the early pioneering of such men as I. C. Bradley, A. E. Staley, Ed Funk, W. J. Morse and Russell J. East. He also tells of the development of soybean glue by I. F. Laucks; protein fiber by Robert Boyer; and the newer fire fighting foam from the Alpha protein of the Glidden Co.; as well as many other soybean products.

Soybeans, of course, are only one of many farm crops covered. But many of our readers will find themselves not unacquainted with the crop uses mentioned and the personalities involved. A number in our industry have been closely connected with the chemurgic movement from its beginning. On the present board of governors of the National Farm Chemurgic Council are: G. G. McIlroy, former president of the American Soybean Association and a present ASA director from Ohio; and E. J. Dies, former president of the National Soybean Processors Association.

In fact, soybeaners should feel right at home in this book.

FROM AUSTRALIA

The demand for soybeans in Australia now exceeds production from present cultivated areas and big developments are planned for the expansion of the industry, reports *Australian Agricultural News*. In Brisbane (Queensland), Melbourne, (Victoria) and Sydney (New South Wales), mills have been prepared to process 1,000 tons of soybeans a week each. Australian manufacturers have already placed orders for 30,000 tons of oil a year. In New South Wales this year, an initial 2,000 acres have been planted and it is hoped to add large tracts in the coming season. Australian agriculturists say the crop is ideal because of its ready market, soil building properties, and it fits into crop rotation.

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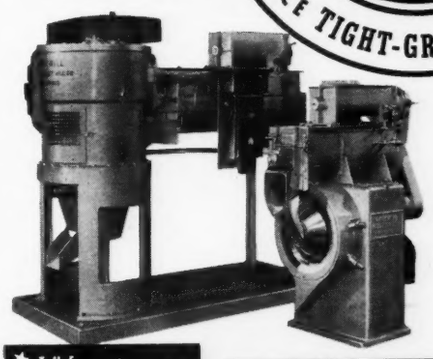

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YIELD CONTESTS

(Continued from page 13)

the state, as well as for the state winner. These will be made on the basis of four factors—yield, economy of production, oil content, and quality.

The Iowa Soybean Yield Contests are sponsored by the Iowa Corn and Small Grain Growers Association and the Iowa Soybean Processors Association, and by local cooperating organizations.

The state and 12 district contests are being sponsored by the above-named Associations, who are putting up $470 in cash prizes. Appropriate awards for local contest winners are being offered by local sponsoring organizations.

To the first prize winner for the state will go $50 and the John Sand trophy, given each year by John Sand, Marcus, Iowa. The second prize winner receives $35, the third prize winner, $25. District prizes of $15, $10 and $5 are also being offered. Gold medals will be awarded to the growers of the highest yielding 10 percent of the entries completing the contest in each district.

Sponsoring organizations are asked to secure entry blanks and official rules from the Iowa Corn and Small Grain Growers Association. They are also asked to forward names and addresses of all local contestants with $1 entry fee before July 31 to:

Joe L. Robinson, Secretary
Iowa Corn and Small Grain Growers Association
Ames, Iowa.

Details of the local contest including land measuring, harvesting and weighing, will be handled by the local sponsoring organization. Location of the sponsoring organization will determine the district in which each entrant will compete.

CONTESTS IN MISSOURI

The annual Missouri Soybean Achievement Program is being sponsored by the Agricultural Extension Service, and the Gulf, Mobile & Ohio and Alton railroads for farmers in the following counties: Pike, Ralls, Audrain, Callaway, Boone, Howard, Randolph, Saline and Lafayette.

Farmers may enter a minimum of 10 acres in one tract of approved yellow-seeded varieties. Entries close July 1.

Entrants will make a simple report covering soil treatment, varieties and cultural practices used, on forms to be furnished. Yields will be checked and certified by two neighbors and combine operator when harvested. Where field sizes have not been changed, measurements as determined by the government may be accepted. Otherwise measurements must be made.

Growers who produce 30 bushels or more of U S. No. 2 soybeans per acre will be awarded the Distinguished Soybean Grower Gold Medal. Those who produce 25 bushels, but less than 30, will be awarded the Distinguished Soybean Grower Silver Medal.

ARKANSAS CONTEST

This is the first year for the North Mississippi County, Ark., contest.

Any farmer in the county is eligible to enter the contest on payment of $5 entry fee. Deadline is June 1.

First place winner will receive $100 and the Ed Critz trophy, to be held for 1 year. Prizes of $75 and $25 go to second and third place winners.

—s b d—

INDIANA

(Continued from page 13)

sweep on my plow to keep the ground as level as possible, so as to hold all the moisture.

"These Lincoln beans seem to yield more to the acre than any other. I tried them all. The 40-inch row seems to produce more beans than any other way of planting. The best way to get a big yield of beans is to get them all in the combine. Don't rush through at high speed and leave 2 or 3 bushels per acre on the ground. I have raised beans over 20 years, each year getting more beans per acre."

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Years of research and testing in laboratory and field assure the high quality of NITRAGIN legume bacteria. NITRAGIN, the oldest and most widely used inoculant in the world, has outsold all other inoculants for nearly fifty years. Farmers buy it on faith . . . they know it gets results. When you plant soybeans be sure to inoculate with NITRAGIN. Help rebuild soil fertility and help assure success with this important cash crop.

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TO LIVE: JAPAN MUST IMPORT *More Soybeans*

The Manchurian soybean crop in large part holds the key to the economic health of the Japanese people.

This situation is revealed in a special analysis prepared for the Foreign Economic Administration by F. H. Shelledy of the U. S. Tariff Commission.

The Japs are short of livestock and of meat, milk and eggs. So they lean on soybeans for their protein foods. They also use soybeans as fertilizer for their land.

In the past the heavily peopled islands have grown only one-third of their needed soybeans. The rest have come from Manchuria, chief supplier to the world soybean trade, and to a smaller extent, from Korea.

The soybean was one reason why the Japs over-ran Manchuria. Their war lords made heavy demands on the soybean crops of the Manchurian farmers.

Now, however, the Manchurians are growing a third fewer soybeans than they were before the war. Long the world's second soybean producing country, it is unlikely that Manchuria grew 100 million bushels in 1946—only one-half the U. S. crop. But the little farmers of Japan can probably grow no more soybeans than they now grow. How is the gap to be made up?

—Photo courtesy W. J. Morse

Green Vegetable soybeans in a Tokyo market. Japanese eat their own soybeans, import Manchurian beans for oil and fertilizer.

Shelledy's report on soybeans was one of a number prepared by the Tariff Commission for the Foreign Economic Administration in 1944 and 1945.

Before the war Japanese farmers grew from 10 to 14 million bushels of soybeans annually. Most of their crop found its way to the island markets, being superior for food to the beans imported from Manchuria and Korea.

Housewives used the soybeans in bean soup and tofu or soy cheese. In addition they used it in the soy sauce of the Orient that has found its place in the U. S.

But Japanese farmers used a large part of the crop as green manure, since they lacked animal manures. They also depended on the Manchurian soybeans as a source of fertilizer. Soybeans imported from Manchuria were pressed into cake and oil, and the cake spread on the land as fertilizer. Before the war the Japanese were importing 26 million bushels of soybeans annually.

Need of the land for manure is shown by the fact that Japanese soybean oil production is valued at only a fraction of the cake. It is apparent that without heavy imports the productivity of Japan's farms will go down rapidly.

Concerning the chance of planting more land to soybeans, Shelledy points out, "Any increase in the area devoted to soybeans would reduce the area devoted to other essential crops unless it occurred on land previously uncultivated, or on land formerly devoted to purposes for which the need no longer existed."

He believes farmers might shift small areas from mulberries, vegetable and flower seeds, and lily bulbs.

"Actually there appears to be little chance of any substantial increase in soybean production in Japan. If Japan is to have sufficient soybeans to supply its needs, it will have to import most of them," Shelledy says.

Only other possibility, if the health of the islands is to be maintained, is to increase imports of other fertilizers and oils, he believes.

Soybeans: Production, imports, exports, and apparent consumption, Japan Proper and Karafuto, 1928-39, average 1928-32, annual 1933-37.

Year	Production	Imports: From Empire areas	Imports: Other	Imports: Total	Exports	Apparent consumption: Total	Apparent consumption: Per capita
	Quantity (1,000 bushels)						(bushels)
1928	14,110	24,361	53	24,414	132	38,392	0.62
1929	12,585	27,893	2	27,895	136	40,344	.64
1930	14,381	23,025	21	23,046	120	37,307	.58
1931	11,777	28,455	1	28,456	137	40,096	.61
1932	11,435	25,942	3	25,945	78	37,302	.56
Average, 1928-32	12,858	25,934	16	[1] 25,950	120	38,688	.60
1933	13,307	23,461	..	23,461	66	36,702	.54
1934	10,255	27,577	..	27,577	44	37,788	.55
1935	10,719	24,290	4	24,294	50	34,963	.50
1936	12,485	26,801	..	26,801	78	39,208	.56
1937	13,473	28,039	1	28,040	62	41,451	.58
Average, 1933-37	12,048	26,034	1	[1] 26,035	60	38,023	.55
1938	12,798	30,264	..	30,264	88	42,974	.59
1939	14,062	(2)	(2)	(2)	(2)	(2)	(2)

[1] The value of imports in 1928-32 was 60.6 million yen annually and in 1933-37, 74.1 million yen (see table 2).
(2) Not available.
Source: Production, U. S. Department of Agriculture, Agricultural Statistics, 1939 and 1943, and Office of Foreign Agricultural Relations; trade, official returns of the foreign trade of Japan, Formosa, and Korea.

Soybeans: Imports into Japan by principal sources, average 1928-32, annual 1933-39

Country	Average 1928-32	1933	1934	1935	1936	1937	Average 1933-37	1938
	Quantity (1,000 bushels)							
Empire areas:								
Manchuria (incl. Kwantung)	18,228	15,973	20,128	19,184	20,363	22,104	19,550	24,623
Korea[1]	7,674	7,462	7,411	5,067	6,411	5,907	6,452	5,622
Formosa[1]	32	26	38	39	27	28	32	19
Total	25,934	23,461	27,577	24,290	26,801	28,039	26,034	30,264
Non-Empire areas	16	..	..	4	..	1	1	..
Grand total	25,950	23,461	27,577	24,294	26,801	28,040	26,035	30,264

HENRY FORD WAS A SOYBEAN PIONEER

Henry Ford, who died at his home in Dearborn, Mich., April 7, left a name that will be closely associated with the soybean for years to come.

The Ford Motor Co. had discontinued all its soybean operations at the time of the great industrialist's death. But Ford did some of the pioneering work in developing new uses for the crop; and gave soybeans publicity that vastly increased the interest of the public in them.

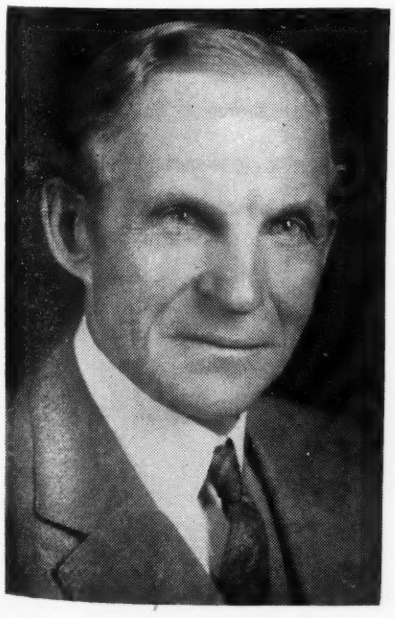
In 1929 Ford started experiments at Dearborn to determine what farm crop could be grown in Michigan and utilized in industry. The soybean was selected as being the most practical.

Ford's policy was to produce raw materials as close to the point of processing as possible. With this in mind, he gave a great deal of effort to increasing soybean acreage near the Ford plants in southern Michigan. Then in 1937-39 the Ford Motor Co. built three solvent extraction plants at Salina, Milan and at the Rouge plant in Dearborn.

Before the war Ford was using soybean products in many ways in the manufacture of automobiles. For a number of years the car body enamel contained 35 percent soybean oil. In 1937 300,000 gallons of soybean oil was used for this purpose. The firm used thousands of gallons for shock absorber fluid. The foundry used both soybean oil and meal, the latter as core binder.

But by far the most spectacular in the public mind was Ford's work with plastics. The actual usage was small compared with the tremendous publicity resulting. But some auto parts were made for several years from soybean molding compound. These included coil cases, accelerator pedals, horn buttons and distributor heads.

HENRY FORD



Work on soy fibers was done at the Ford plant. This was under Robert Boyer, who has continued the project with the Drackett Co. Ford also experimented with soy food products, manufacturing soy milk and canning edible soybeans.

It was the efforts of the Ford publicity machine, probably more than anything else, that caused the soybean to become associated chiefly with paint and plastics in the public mind, although other uses have always been far more important.

Most soybean usage was discontinued by the Ford firm during the war and all its soybean processing plants have been sold.

Ford offered considerable inspiration to the farm chemurgic movement. He was one of the founders of the National Farm Chemurgic Council.

—s b d—

A MAJOR PAINT OIL?

A letter calling attention to the value of soybean oil has been mailed to paint manufacturers by George H. Priest, Jr., director of the technical field service of the National Paint, Varnish and Lacquer Association.

Quoting Mr. Priest:

"Until last fall the use of soybean oil as a drying oil was prohibited and until revocation of the governing order 1946 consumption in the manufacture of resins and as a lacquer plasticizer was restricted on the basis of 1945 use. All prohibitions have now been removed, however, and many paint manufacturers are making good use of soybean oil.

"While edible uses still predominate, and probably always will, there is every indication that the soybean crop has arrived and will have permanent stability superior to that of our flax crop.

"Accordingly, while it may still be difficult to obtain large quantities on spot order it is suggested that all manufacturers give consideration to the use of soybean oil in the products for which it is suitable. Soybean in itself is a semi-drying oil with definite limitations but there are processed oils available or upon the horizon which make it apparent that there will be a wide field of usefulness for soybean oil in our industry and that the soybean crop may become one of the major sources of our drying oil supply."

—s b d—

SMOTHER CROP

The value of soybeans can be increased by using them as a smother crop for European bindweed, (creeping jenny), and Canada thistle, reports E. P. Sylwester, of Iowa State College. Sylwester says experimental work with weeds has shown definitely that a heavy stand of drilled soybeans is one of the best smother crops that can be used on land infested with either of these weeds.

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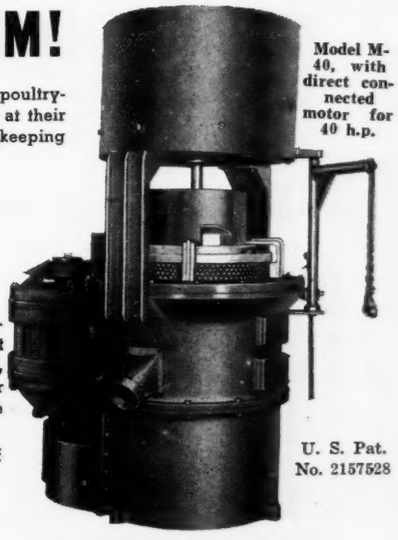

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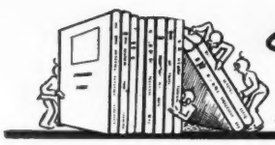

Publications

Soy Flour

A COMPARATIVE STUDY OF SOY FLOURS FOR USE IN BAKING. By E. C. Faulkner and J. I. Simpson in *Food Research.*

Soy flours are usually classified according to fat content. Other constituents affecting baking quality vary with fat content. Variable physical properties include weight per unit volume, water absorption, size of particle, color, flavor, and keeping quality.

Examination of 18 samples of soy flour from different parts of the U. S. revealed a tendency for moisture content, weight per unit volume, and water-absorption capacity to decrease as the fat content increases. Size of particle tends to increase with increase in fat content. High-fat flours are somewhat darker in color than those of the other two classes.

Baking experiments were made to determine the palatability of muffins and plain shortened cakes containing soy flour, and the merits of soy flours of different fat content. Index to volume measurements of cakes and muffins showed little difference in volume with respect to type of soy flour. Differences in quality of the products according to type of soy flour used were not statistically significant, although some degree of preference was shown for high-fat soy flour in muffins and possibly cakes.

Fertilizers

SUBSTITUTION OF SODIUM FOR PART OF THE POTASSIUM IN MIXED FERTILIZERS. By Charles B. Sayre and M. T. Vittum, head and assistant professor respectively of division of vegetable crops, New York State Agricultural Experiment Station, in *Journal of the American Society of Agronomy,* February, 1947.

Due to the potash shortage, it has been suggested that sodium might be substituted for part of the potassium in mixed fertilizers.

The experiments were undertaken as an emergency measure in order to supply data in time for the 1947 fertilizer program. Crops used were soybeans and beets. Four different levels of potash were supplied to the crops, together with four levels of sodium chloride, and including a no-sodium treatment at each potash level.

Soybeans were included as a crop which benefits from sodium only when there is a potash deficiency; beets as a crop which benefits from sodium when there is an ample supply of potassium.

The two crops gave strikingly different responses to the various potassium and sodium levels. The crop yields indicated that sodium chloride may be substituted for a portion of the potash in mixed fertilizers where the supply of potash is inadequate for the best growth of either crop. But where enough potash can be supplied, the substitution of sodium for part of the potash will decrease the yield of soybeans.

For beets, however, results indicated that the partial substitution of sodium for potassium would be profitable.

Crop Nutrition

THE NITROGEN NUTRITION OF SOYBEANS: II. EFFECT OF AVAILABLE SOIL NITROGEN ON GROWTH AND NITROGEN FIXATION. By A. G. Norman and L. O. Krampitz, in *Soil Science Society Proceedings.*

Several greenhouse experiments by the authors at Iowa State College add to existing evidence that the soybean plant under Midwest field conditions gets much of its nitrogen from that available in the soil, and not from fixation by its root system alone.

The inoculated soybean plant can grow well on the nitrogen which it supplies for itself, but research men have shown that it can make use of more nitrogen than it can obtain in this way.

The greenhouse experiments demonstrated that nodulated soybeans do not make maximum yields when depending mainly on nitrogen fixation for their nitrogen needs. Increased yields and higher total nitrogen content are obtained when ample available nitrogen is present in the soil.

Rotation

BEST SOYBEANS TOO LATE TO FOLLOW WITH WHEAT IN PENNSYLVANIA. Bulletin 480. 59th annual report Agricultural Experiment Station, State College, Pa.

Soybean trials conducted at State College and Hershey by C. J. Irvin have shown several of the newer varieties to be quite promising in yield. Unfortunately the better yielding varieties are so late in maturing as to make it impossible to follow soybeans with wheat except in the southern Pennsylvania counties.

Of 35 varieties grown last year for seed at State College, 10 yielded over 30 bushels per acre, the highest being 33.7 bushels.

The high yielding varieties in the order named were: Lincoln, Chief, Viking, Late Pennsoy, Manchu, Dunfield, 105-38, Manchuria and Mansoy.

In forage tests, Wilson Five yielded 4595 pounds of dry hay per acre. Five varieties produced higher yields, the highest being 5445 pounds of hay per acre.

In the Hershey test the highest yielding variety was Chief with 41.3 bushels per acre. Two other varieties, Gibson and Patoka, yielded over 40 bushels per acre. But all three of these varieties required from 146 to 150 days to mature.

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Production Cost

LABOR REQUIREMENTS ON THE SOYBEAN CROP. *Bulletin 491,* Missouri Agricultural Experiment Station.

In the fall of 1942 under the direction of B. H. Frame, group meetings were held in 16 different counties distributed over the state. These meetings were attended by from 6 to 25 farmers and a total of about 225 individuals were interviewed. Information on time requirements of field operations and care of livestock were secured. Preliminary work has been completed on the crop enterprises.

Soybeans cultivated and used for grain required 6.91 hours of man labor per acre up to the time of harvest. Cutting and threshing from the shock added an additional 6.58 man-hours per acre. However, if the soybeans were combined the labor requirements for harvesting amounted to 1.58 hours. Soybeans not cultivated required 4.01 hours of man labor up to harvest time. If beans were cut and put up loose, the labor requirement was 6.64 hours additional per acre and baling added another 1.28 man-hours per acre.

Insects

RESISTANCE OF SOYBEAN VARIETIES TO JAPANESE BEETLE ATTACK. By Beckford F. Coon, Pennsylvania State College, in *Journal of Economic Entomology.*

Twenty-six varieties of soybeans were planted in 1944 to test varietal resistance to Japanese beetle attack. All were found susceptible.

Greatest injury had occurred by the last of July in all plots. Late varieties recovered from beetle injury by continued growth after the beetles disappeared. Early varieties failed to make this recovery.

Increased recovery from beetle injury resulted in increased grain yield. Grain yield increased with increased mature plant height up to a certain point beyond which yield decreased. It is possible that excessive plant height was made at the expense of grain production.

Feeding

SOYBEAN OIL MEAL IN POULTRY RATIONS. At the Maryland Experiment Station an investigation was made to determine the ability of various materials to supplement a starting and growing mash containing soybean oil meal as the only protein supplement.

Also, tests were made of a laying mash containing soybean oil meal and corn gluten meal as the only protein supplements.

Broilers were grown satisfactorily on mashes containing the following combinations of protein supplements: 25 percent soybean meal and 4 percent fish meal; 25 percent soybean oil meal and 4 percent dried skim milk; 15 percent soybean oil meal and 15 percent corn gluten meal.

Combinations of soybean oil meal with meat scrap were not satisfactory except in the case of a special meat scrap containing a large proportion of intestinal linings.

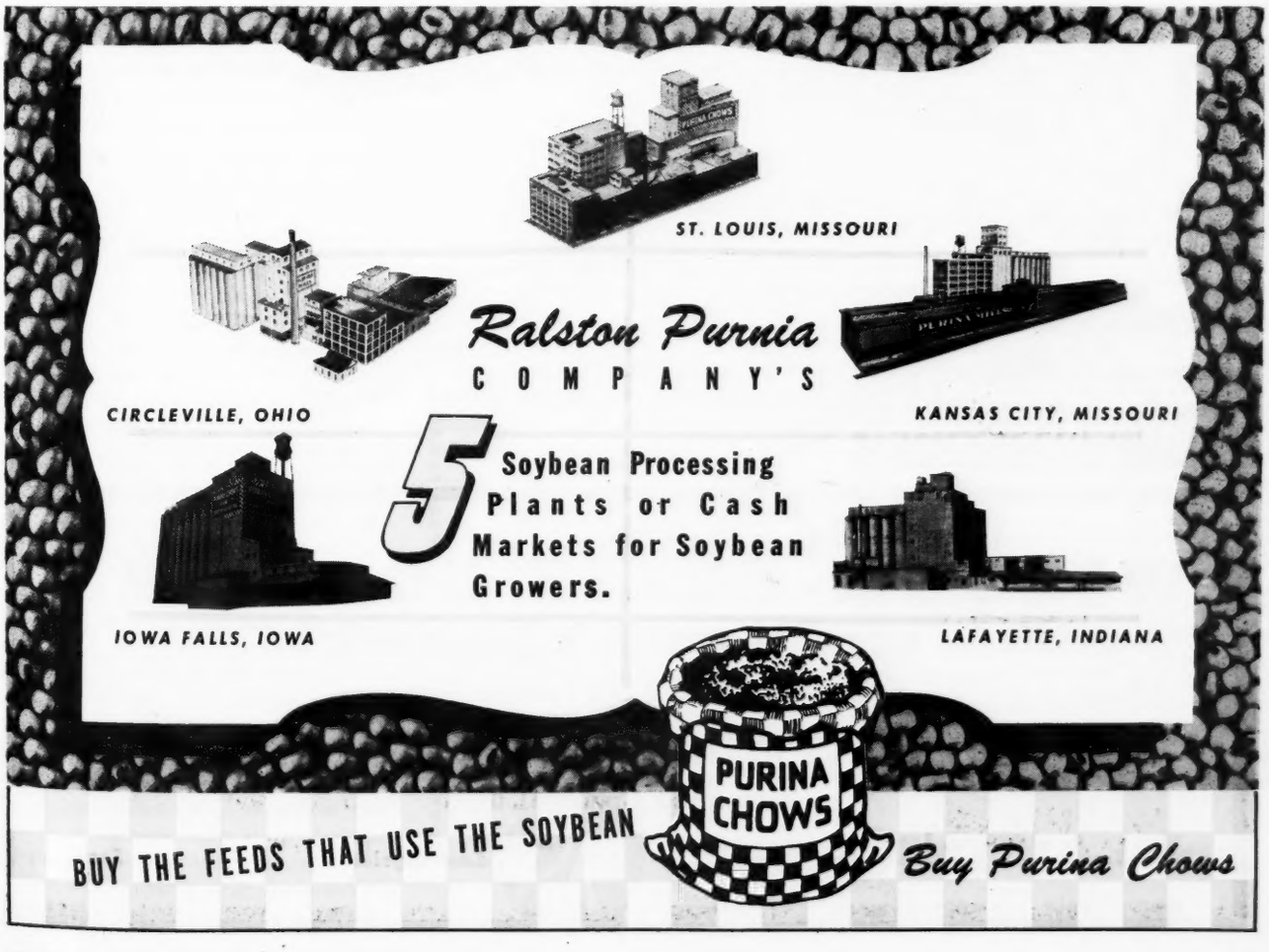
Other materials that did not effectively supplement high soybean oil meal diets were: Blood meal, dried fish viscera, powdered swine hoofs, soybean lecithin, NaCl, and KI.

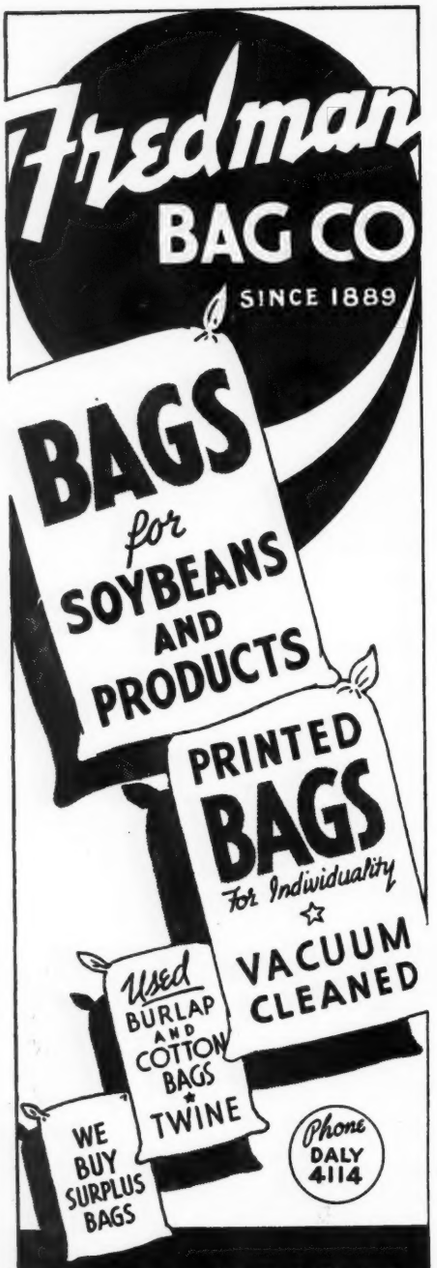
A laying mash containing soybean oil meal and corn gluten meal as the only protein supplements supported excellent production and maintained body weight throughout a 7 months' experiment.

Protein

LIME HYDROLYSIS OF SOYBEAN PROTEIN. By Joseph M. Perri, Jr., and Fred Hazel, department of chemistry and chemical engineering, University of Pennsylvania. *Industrial and Engineering Chemistry,* May 1946.

The hydrolysis of Alpha soybean protein with calcium hydroxide has been studied under various conditions and reported here.





SEEDBURO EQUIPMENT CO. EXPANDS IN NEW CHICAGO QUARTERS

Seedburo Equipment Co. announced removal of its general office and warehouse to much larger quarters, in the Converse Building, 618-626 W. Jackson Blvd., Chicago 6, Ill., May 1.

The change was necessary to accommodate the firm's rapidly expanding business in seed and grain testing and grading equipment, and also in general equipment for the grain, seed, milling and allied trades.

The improved facilities of the new location will better serve the firm's customers. An enlarged staff and streamlined equipment will speed up clerical work involved in the handling of inquiries and orders.

Announcement is made of a change in the organization. The company, formerly operated as a partnership, is now a corporation. The operating heads are:

Claire I. Smith, chairman of the board; Irving B. Phillips, president; P. W. Burrows, vice president and general manager; L. W. Faulkner, director of Steinlite research and development; Richard D. Harfst, treasurer; Gail Smith Phillips, secretary; Elsie Kolb, assistant treasurer; and Louise M. Pankon, assistant secretary.

Mr. Phillips is a brother of the late Charles S. Phillips, formerly general manager of the firm. He has been vice president of the Northern Trust Co. of Chicago and director of numerous corporations.

The company was originally organized in 1912 by the late LeRoy M. Smith.

—sbd—

SUNFLOWERS A RICH SOURCE OF PROTEIN

Sunflower seed has long been looked upon only as good "chicken feed." But Illinois scientists have now proved that the seed meal, or flour, is a rich source of protein of high digestibility and nutritive value.

Research workers at the University of Illinois herald the flour as "exceptionally rich in the vitamins thiamine and niacin"—vitamins which we have heard so much about in recent years.

Reported in a new circular issued by the Illinois Agricultural Experiment Station, conclusions of the experiments point out that the protein of the sunflower for growing poultry and swine and laying pullets is comparable to the protein in tankage, soybean meal, meat scraps and peanut meal.

The nutritionists in the departments of home economics and animal husbandry conclude that sunflower seed is "indeed a promising feed and food crop."

The home economists say that in human nutrition sunflower-seed flour would seem to be a logical supplement to white flour, correcting many of the nutrient deficiencies of this widely used food. Cooking tests have shown that chocolate, spice and plain cakes and griddle cakes containing up to 10 percent of sunflower-seed flour are delicious. They are rich and full-flavored, moist, fine- and even-textured, and have somewhat greater volume than standard cakes made of 100 percent patent flour.

Under favorable conditions yields of 1,000 to 1,800 pounds of sunflower seed to the acre may be expected in central Illinois and yields of 500 to 800 pounds in south-central, southwestern and southern Illinois. More information is needed concerning seed-producing ability, especially of the newer varieties. Problems of harvesting seem to be on the road to solution. Problems of disease control, insect infestation and crop destruction by birds and other pests are still under study.

Sunflower seed averages from 26 to 32 pounds a bushel. It contains from 36 to 46 percent of hulls and 63 to 54 percent of meat, depending on the variety. The meats contain about 50 percent of oil and 31 percent of protein. Sunflower-seed oil dries more slowly than soybean oil and is said to be of high quality as a salad oil for human use.

The meal used in all of the Illinois laboratory tests was prepared by the VioBin Corp. of Monticello, Ill., and donated to the agricultural experiment station by the corporation and the Piatt County sunflower committee.

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SOYBEAN STANDARDS HEARINGS

Four informal hearings were held at Toledo, Ohio, Peoria and Chicago, Ill., Cedar Rapids, Iowa, May 12-15 on proposals to amend the official U. S. grain standards for soybeans.

The U. S. Department of Agriculture called the hearings to consider whether:

1. The maximum limits for splits should be increased 5 percent in grade No. 2; 5 or 10 percent in grade No. 3; and 10 percent in grade No. 4.

2. The definition for soybeans should be amended to fix a maximum limit for splits.

3. The maximum limits for damaged kernels of soybeans and other grains should be increased not more than 1 percent in grade No. 1; not more than 2 percent in grade No. 2; not more than 3 percent in grade No. 3; and not more than 7 percent in grade No. 4.

4. The maximum limits for foreign material other than dockage should be increased not more than 1 percent in grade No. 1; not more than 2 percent in grade No. 2; not more than 4 percent in grade No. 3; and not more than 5 percent in grade No. 4.

5. Moisture content should be discontinued as a numerical grading factor and in lieu thereof a new special grade "Tough" be promulgated for soybeans containing 14 percent or more moisture.

6. Soybeans with green seed coats, which are yellow, or have a yellow tinge, in cross section should be included in the class "Yellow Soybeans".

7. 10 percent of other classes should be permitted in classes "Yellow Soybeans" and "Green Soybeans".

8. 5 percent of Brown, Black, or bicolored soybeans, singly or combined, shall be permitted in grade No. 2 of the classes "Yellow Soybeans" and "Green Soybeans".

9. The definition for splits shall be amended to include all pieces of kernels of soybeans.

At the same time consideration was given proposals to amend the regulations under the U. S. Grain Standards Act so that the moisture content of soybeans will be shown in whole and half percents instead of whole and tenth percents, and to require licensed inspectors to state the moisture content on all certificates of grade issued for soybeans, except for export shipments.

All persons interested in the proposed amendments were asked to present their views and opinions orally at the May hearings or submit written data, views, or arguments to the director, grain branch, Production and Marketing Administration, U. S. Department of Agriculture, Washington 25, D. C., to be received by him not later than May 29. Decisions will be made after that date whether any or all of the proposed amendments shall be promulgated.

—sbd—

STALEY TO INCREASE EMPLOYEE BENEFITS

A. E. Staley Manufacturing Co., Decatur, Ill., has announced it will start paying benefits for occupational accidents about double those provided by the Illinois Workmen's Compensation Act.

Under the Illinois law, compensation paid to injured employees ranges from $18 to $24 weekly. The new Staley plan provides for benefits of as much as $56 a week for an employee earning $70 weekly and who has a wife and three children.

Death and permanent disability payments will be increased in like proportion, it was announced by A. E. Staley, Jr., president of the corn and soybean processing concern.

In announcing the company's intention to "modernize" its application of compensation laws, Staley said that these laws were all right when enacted but that figures written into the law are obviously too low today in view of present day wage rates.

The cost of the programs will be about double what it has been and will be borne by the company.

Smarty Pants! Colorful, re-usable KEN-PRINT Bags are turning up everyplace these days . . . and here's why!
Women are buying flour, feed, sugar, salt—any product packed in re-usable P/K Bags. Sis and Mom get an eyeful of the eye-appealing packages and they get conversion minded.
If your products are resting peacefully on retailers' shelves, let Percy Kent offer suggestions that will make them move. Double-quick, that is!

PERCY KENT BAG CO., INC.
BUFFALO KANSAS CITY NEW YORK

GRITS and FLAKES...

FROM THE WORLD OF SOY

Swift & Co. Oil Mill, Cairo, Ill., is installing all-purpose expellers to replace its hydraulic presses, in order to run both cottonseed and soybeans. A. S. McGinnis is superintendent in charge of installations.

* * * *

H. V. Nootbaar & Co., grain and feed concentrate factors of Pasadena and Oakland, Calif., announce the association of Douglas G. Joy with the firm. Mr. Joy was with the Southern Pacific Co. for a number of years.

* * * *

Ralston Purina Co. has been awarded the Liberty Mutual Accident Prevention flag in recognition of an industrial safety record 97 percent above average.

* * * *

J. D. Sykes was recently elected vice president of the Ralston Purina Co., with which he has been associated since 1941. He was made director of public relations this year.

* * * *

Election of William H. Versfelt and Edward G. Murray as vice presidents of the St. Regis Paper Co., New York, N. Y., has been announced. Also announced is the election of two new directors: Ashley D. Pace and Gurdon W. Wattles.

* * * *

Virgil H. Scroggs has been appointed chief of research and distribution for Western Soybean Mills, Sioux Falls, S. D., and its feed division, Sioux Sales Co. Mr. Scroggs was chief of the laboratories for the Transit Grain Co., Fort Worth, Texas.

* * * *

Bemis Bro. Bag Co., will open a plant in Jacksonville, Fla., for manufacture of both open mesh and textile bags. L. L. Conrad, a Bemis employee for 37 years, will manage the plant.

* * * *

Papers at the May meeting of the American Oil Chemists' Society, New Orleans included: "Effects of Deodorization on the Stability of Vegetable Oils," by A. R. Baldwin, Corn Products Refining Co., and "Sampling of Cottonseed, Soybeans and Peanuts," by R. T. Doughtie, Jr., USDA, Memphis.

* * * *

Kansas Soybean Mills, Inc., Emporia, Kans., has completed a fine new suite of offices, including an accounting office, board of directors meeting room, and research laboratory.

* * * *

Allan Kluck, Isanti County, Minn., farmer received the W. G. Skelly Agriculture Award on "This Farming Business," NBC network program April 26. Principal cash crop on Kluck's 890-acre farm is soybeans. He harvested 2,000 bushels in 1946.

* * * *

Harold E. Jamison, Scottsbluff, Nebr., has been named managing director of the Feed Institute of Iowa. He succeeds O. N. LaFollette, who recently joined the Iowa Department of Agriculture.

* * * *

R. L. Bradley, formerly superintendent of the Swift Oil Mill at Blytheville, Ark., is superintendent of the new Swift solvent extraction plant in Memphis, Tenn. Dan Blodgett succeeds Mr. Bradley at Blytheville.

* * * *

E. L. "Bill" Berry, vice president in charge of production of the Link-Belt Co., Chicago, died suddenly from a heart attack April 3. Mr. Berry began his Link-Belt career as a machinist in 1914.

* * * *

"Soybean Lecithin Comes of Age," was an article by Joseph Eichberg, president of the American Lecithin Co., in the March 31 issue of CHEMURGIC DIGEST.

* * * *

Harry Neal Baum, for more than 10 years advertising manager of Fairbanks, Morse & Co., has become associated with Gebhardt & Brockson, Inc., Chicago agency which handles Albert Dickinson Co. and Seedburo Equipment Co. advertising.

* * * *

As part of its 100th anniversary celebration, Chase Bag Co. has announced completion of its St. Louis factory at 5033 Southwest Ave. Chase has maintained continuous operation in St. Louis since 1866.

O. K. QUIVEY

QUIVEY IS ACTIVE IN SOYBEAN WORK

O. K. Quivey, manager agricultural development of the Baltimore and Ohio Railroad, was elected president of the American Railway Development Association at its annual meeting held at Dallas, Tex.

Mr. Quivey has just finished his term as first vice president of the association which is composed of agricultural, marketing, land settlement, industrial, real estate and public relations representatives of the leading railroads of the United States and Canada.

Mr. Quivey entered B & O service as agricultural agent in 1917. He became manager agricultural development in 1936.

Mr. Quivey has long actively promoted soybean growing in B & O states. The railroad has backed campaigns for planting of adapted varieties in recent years.

But the Soybean Special trains which toured leading soybean states for several years just before the war attracted most attention. Mr. Quivey set these up. The Soybean Special included lecture and exhibit cars, as well as a car devoted to a soybean cooking school.

The Special created a tremendous amount of interest in soybean growing as a crop. In 1941 the train made 51 stops in Ohio, Indiana and Illinois, and was visited by 20,000 people.

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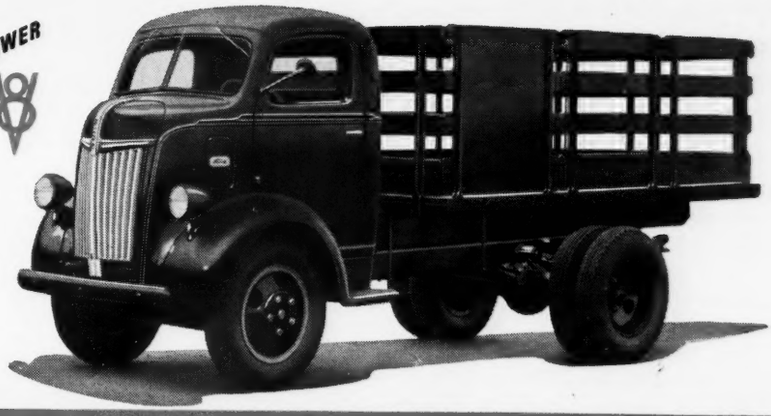
WITH BANKS FIRM

James E. Fletcher has been appointed district manager for Iowa and Nebraska for William H. Banks Warehouses, Inc., Chicago, D. H. Coffman, vice president, announces. Fletcher's headquarters will be in Des Moines.

THE 6 — YOUR PICK OF POWER — THE V-8

Ford Cab-Over-Engine units, in 1½- and 2-ton nominal ratings, are available in 101", 134" and 158" wheelbases. The 134" chassis and cab, with Ford 12-foot Platform Stake Body, is pictured. Less garage space, shorter turning radius and shorter overall length for trailer service are important Ford C.O.E. dividends to owners.



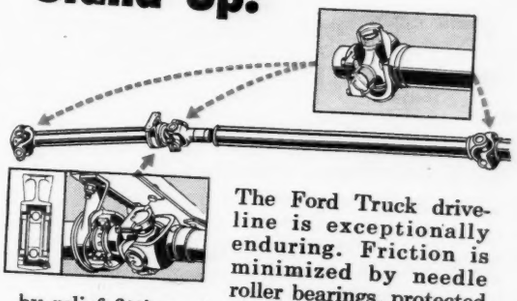
"WE AGREE— FORD TRUCKS LAST LONGER!"

Mr. Robert S. Swanson, treasurer, S. B. Thomas, Inc., Long Island City, N. Y., wrote recently: "In our fleet of 128 Ford Trucks, 36 are over 10 years old, and 6 are 1932 models—14 years old! Their reliability and economy have given us good reason to be thankful that Ford Trucks Last Longer."

ONLY FORD GIVES YOU ALL THESE LONG-LIFE TRUCK FEATURES: Either of two great engines, the V-8 or the SIX, both with full pressure lubrication to all main, connecting-rod and camshaft bearings, Flightlight oil-saving 4-ring pistons, precision-type heat-resistant bearings and fast-warmup temperature control • rear axle design that takes all weight load off the shafts (¾-floating in half ton units, full-floating in all others) • heavy channel section frames, *doubled* between springs in heavy duty models • big, self-centering brakes, with heavy, cast drum surfaces, non-warping and score-resistant—all told, *more than fifty* such examples of Ford endurance-engineering.

NATURALLY, FORD TRUCKS LAST LONGER! Latest 1946 registration figures show that 78% of all 1936 model Ford Trucks in use 9 years ago are still on the job! That's up to 15.8% better than the records of the next four sales leaders—5% better than the average of all four. More than 100 body-chassis combinations. See your Ford Dealer!

ONE Big Reason— Ford Drive-Line Units Stand Up!



The Ford Truck drive-line is exceptionally enduring. Friction is minimized by needle roller bearings, protected by relief fittings, in all universal joints in all models. Half-ton chassis have two such joints. All other models (except 101" w.b.) have three, and, in addition, a heavy duty ball center bearing. This bearing is self-aligning—cushion-mounted in live rubber. It is leakproof, excluding dust and water. It is unaffected by frame flexing and is notably long-lived. Large-diameter tubular steel propeller shafts with forged ends are properly balanced. This assures freedom from destructive vibration and great strength without excess weight.

Ford

MORE FORD TRUCKS IN USE TODAY THAN ANY OTHER MAKE

The Borden Co., New York, will spend more than 26 million dollars for expansion in 1947, it is announced.

* * * *

"How to Squeeze a Soybean," was title of a recent impressive full-page ad by Phillips Petroleum Co. in *Saturday Evening Post.* Featured is Phillips Normal Hexane solvent.

* * * *

A decision of the U. S. Circuit Court of Appeals found for Pillsbury Mills, Inc., and reversed a lower court decree involving use of the firm's trademark, "Golden Bake," for a soya pancake mix. The case against Pillsbury was brought by Soya Food Mills after notification that its trademark, "Golden Soya Griddle Mix," was an infringement on the Pillsbury trademark. Soya Food Mills has announced it will appeal the case to the U. S. Supreme Court.

* * * *

Merle A. Blue, formerly of Vincent, Iowa, has succeeded E. L. McIntosh as manager of the soybean processing plant of Consumers Cooperative Association of Coffeeville, Kans.

* * * *

Senhor Guido Fernandes of Brazil, has completed his 2-year tour of America, studying the soybean and cottonseed industries. He will return to his country soon. He plans to grow large acreages of soybeans, and eventually to install a processing plant. While here, he spent about 6 months each at the Southern Regional Research Laboratories, New Orleans, and the Northern Research Laboratories, Peoria, Ill.

* * * *

Richard Alcott, vice president and general manager, Riechman-Crosby Co., Memphis, is a proud grandfather. His namesake, Richard was born April 22, weighing 7 pounds 10 ounces. The father, Harry Alcott is with the Dabney-Alcott Supply Co. of Memphis.

* * * *

William S. North of the Union Special Machine Co., Chicago, has been made assistant general manager of the firm in addition to his duties as vice president. He has been active in the company for 11 years.

* * * *

Exhibit Pictures from the Four Regional Research Laboratories is title of *Miscellaneous Publication No. 617* of the U. S. Department of Agriculture. Included as exhibit photos of the Northern Regional Research Laboratory are waterproof plywood glue, Norelac and an improved drying oil from soybeans, all soybean products.

* * * *

Dean Acheson, under secretary of state, was speaker at the annual meeting of the Delta Council at Cleveland, Miss., May 8.

* * * *

Thomas J. Luby has been appointed superintendent of the Hagerstown, Md., soy flour mill of the Soya Corp. of America. Mr. Luby returned to the U. S. recently after several years in Peru as superintendent of the Compania Molinera del Peru at Lima.

* * * *

Plans have been completed for an extensive new addition to the B. I. Weller plant located at East Chicago, Ind. Production will be streamlined with the most advanced type of modern equipment to meet the growing demand for the Calumet Cup.

* * * *

The St. Regis Sales Corp of New York has announced the opening of a multiwall paper bag sales office in Louisville, Ky., at 318 Martin Brown Bldg. The office is under the supervision of Charles C. Keefer.

* * * *

ELEMENTS OF SOIL CONSERVATION, *by H. H. Bennett, chief of Soil Conservation Service, USDA, has been published by McGraw-Hill Book Co., Inc.*

* * * *

Luxora Gin Co., Luxora, Ark., will install an elevator during the summer for handling 100,000 bushels of soybeans. They have just completed installing unloading equipment.

* * * *

The Riechman-Crosby Co., Memphis, Tenn., held a 3-day sales conference April 24-26. Richard Alcott, vice president and general manager, was in charge.

* * * *

Bouncing tornado and terrific winds that twept through parts of Arkansas and Missouri May 1 completely wrecked the Blytheville Soybean Corp. plant near Holland, Mo. Plans are to rebuild the plant as soon as possible.

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WASHINGTON Digest

By PORTER M. HEDGE
Washington Correspondent for
The Soybean Digest

Research Program A subcommittee of USDA officials is drafting recommendations for the types of research work that might be conducted on soybeans and other fats and oils products under the agricultural marketing and research program authorized by the last Congress.

So far the program is without funds, but the House subcommittee on agriculture appropriations will report out an agricultural money bill this month.

The economy minded subcommittee, headed by Everett Dirksen of Illinois, isn't expected to approve the full 19½ million dollars asked by the President for the first year. However, the outlook is for enough funds to get a small initial program started.

The recommendations of USDA officials on fats and oils research will be checked first with the fats and oils advisory committee of processors and growers.

Later, the overall national advisory committee, working with the Secretary of Agriculture, will select projects to be started first, and recommend allocation of funds.

The research program will be slow in starting. But it has strong bipartisan backing and should build up to a major USDA enterprise in the course of a few years.

The following types of research work now being discussed for soybeans indicate the type of work that will eventually be carried out:

One proposal is to intensify research into the reversion factor in soybean oil to improve soybean oil flavor stability and to increase its market value.

Another is to develop a simple grading device adapted to country elevators which will measure both oil and moisture content of soybeans. The object is to improve grade standards and to give high oil content beans a greater market value.

A third proposal discussed is to improve USDA facilities for collecting more accurate and more complete information on world fats and oils supply and market conditions. The aim is to provide both big and little processors and producers with a type of production and marketing information available now only to the largest processors.

Shift to Soybeans? A fairly big shift in planted acreage from oats to soybeans and corn because of the late spring is indicated by state reports to production officials in Washington.

USDA men here have no way of measuring the amount of the shift, nor how it is likely to be divided between soybeans and corn, at this stage of the season. The first official crop report on soybean planting and production will be available July 10.

In the state reports, even Nebraska, a small soybean producing state, indicates there will be a relatively large shift to soybeans.

Some officials think the shift nationally might increase soybean acreage as much as 500,000 acres. This would be about 5 percent of the present indicated acreage for harvest as beans.

To Produce More Copra? A big increase in Philippine corpra production is expected this year. USDA's latest estimate on production in the Islands in 1947 is 850,000 tons, compared with 700,000 tons last year and a 5-year prewar average of 654,000 tons. Consumption by Philippine crushers is relatively small, amounting to slightly less than 35,000 tons last year.

January-March copra exports from the Islands came to a little more than 300,000 tons. This represented 45 percent of last year's total exports. However, a decline in shipments is expected in the next few months.

Allocations By USDA Here are recent USDA allocations affecting the soybean industry:

The total fats and oils export allocations for the second quarter of this year come to 89,300,000 pounds. This compares with second quarter allocations a year ago of 236,100,000 pounds.

The April-June allocations include (in fat content) 4,400,000 pounds of margarine, 39,700,000 pounds of lard, 22,800,000 pounds of shortening and other edible oils, 11,600,000 pounds of inedible fats and oils, and 10,800,000 pounds of soap.

An emergency allocation of 7,500 long tons of oil cake or meal has been made to Belgium, and 2,500 long tons to Italy.

USDA has approved an allocation of 112,000 pounds of soybean flakes to British colonies and protectorates in exchange for an equivalent amount of copra which U. K. is transferring to the U. S.

Switzerland is getting 180,000 pounds of soybean oil in place of 130,000 pounds of neatsfoot oil originally allocated to that country.

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KEEP NITROGEN HIGH IN CORN

Soil nitrogen has a big say-so in the amount of protein that will end up in the corn crop. With little soil nitrogen the protein may be as low as 8½ or 9 percent compared with 10 or 10½ percent where there has been adequate available nitrogen in the soil.

E. B. Earley, agronomy department, University of Illinois College of Agriculture, Urbana, Ill., says that most livestock feeders have perhaps given little thought to the value of producing or obtaining high-protein corn for feed largely for two reasons:

1. Because of the generally known fact that corn is a nutritionally incomplete feed which must be supplemented with proteins from other sources, such as soybean oil meal, tankage, gluten feed, legume hay, etc., in order that animals may make economical gains.

2. Because the extra feeding value of high-protein corn over low-protein corn was not fully demonstrated through scientific feeding experiments until rather recently.

Earley referred to one experiment which showed that pigs fed high-protein corn consumed 6.3 pounds less protein supplement per 100 pounds of gain than pigs fed a lower protein corn, although nearly equal amounts of the two were consumed. This feeding experiment and others giving similar results indicate the value of increasing the protein content of corn as one means of reducing the cost of producing animals for market.

Hybrid corn containing about 14 percent protein is in the experimental stage and will not be available for several years, Earley says. However, until these high-protein hybrids are available, the protein in present-day hybrids can be economically increased to about 10 or 10½ percent from the general average of about 9 percent.

In suggesting how protein may be increased in corn, the agronomist used as an example the 4-year rotation of corn, soybeans, corn, oats and clover. If there is a large clover crop to be turned under for the following corn crop, no extra nitrogen is recommended. The soybeans should be inoculated to secure as much nitrogen from the air as possible. Corn following soybeans should receive about 75 pounds of commercial nitrogen per acre as plowdown in order to give high yields of corn and protein without appreciably reducing the organic matter of the soil.

The nitrogen recommendation is made on the assumption that the lime, phosphorus and potassium requirements of the soil have been or are being adequately taken care of.

The proper use of legumes and commercial nitrogen is strongly recommended in the farming system to aid in the economical production of a large corn crop possessing a high protein content.

—s b d—

Farmers who use DDT to control various insects that attack legumes need have no fear that this insecticide will destroy nodulation. Tests at the University of Illinois Agricultural Experiment Station show that DDT is not harmful to the production of nodules on legume roots. The only exception is the use of superdoses.

HARTZES GET LIMIT

—Photo Courtesy Seed World

Left to right: Jacob Hartz, Sr., ASA director from Arkansas at Stuttgart; Jake, Jr., and Alfred Hartz snapped on a fishing trip. These members of the well known Jacob Hartz Seed Co. got their limit.

Market Street

We invite the readers of THE SOYBEAN DIGEST to use "MARKET STEEET" for their classified advertising. If you have processing machinery, laboratory equipment, soybean seed, or other items of interest to the industry, advertise them here.

Rate: 5c per word per issue.
Minimum insertion $1.00.

FOR SALE — One Jacobson Feed Mill No. D 34 with direct connected 50 H. P. Howell motor, 3 phase, 60 cycle, 440 volts, 1800 R p m, capacity of Feed Grinder 2 ton per hour. Both motor and grinder in good operating condition. One Acme Hammer Mill Machine No. 125, size 1230 capacity 1½ ton per hour. The mill manufactured by the Acme Bearing Corp., Buffalo, N. Y. in perfect operating condition. Also one No. 7 Buffalo Forge 10 inch outlet Exhaust Blower, manufactured by Buffalo Forge Co., Buffalo, N. Y. This Blower in perfect condition. Write or phone us for any additional information wanted. Quincy Soybean Products Co., 111 S. Front St., Quincy, Ill., Phone 960-961.

WANTED—Back issues of the *Soybean Digest*. We need copies of early issues to complete our files. We will pay 20c each or credit your subscription for the following: any issue of Vol. I; Nos. 1 and 3 of Vol. II; No. 7 of Vol. III. Address Soybean Digest, Hudson, Iowa.

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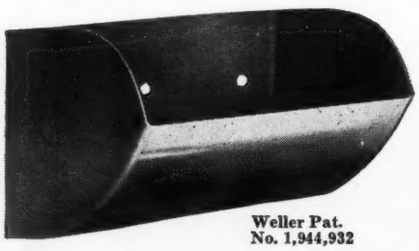

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In The MARKETS

APRIL SOYBEAN, MEAL AND OIL MARKETS DULL AND LOWER

Soybean, oil meal and oil markets were very dull in April. All three items lost considerable ground during the month. Beans and meal reversed the upward market trend begun in February and worked back down to February levels.

However, the soybean market was largely nominal. No cash sales and only a few bids were reported in Chicago in April. Most crushers seemed to be well supplied with beans for current operations. With both oil and meal showing weakness, they were not anxious buyers.

High bid of the Chicago market for No. 2 yellow was $3.92 reported April 2. Low bids of $3.15 were reported between April 25 and 30.

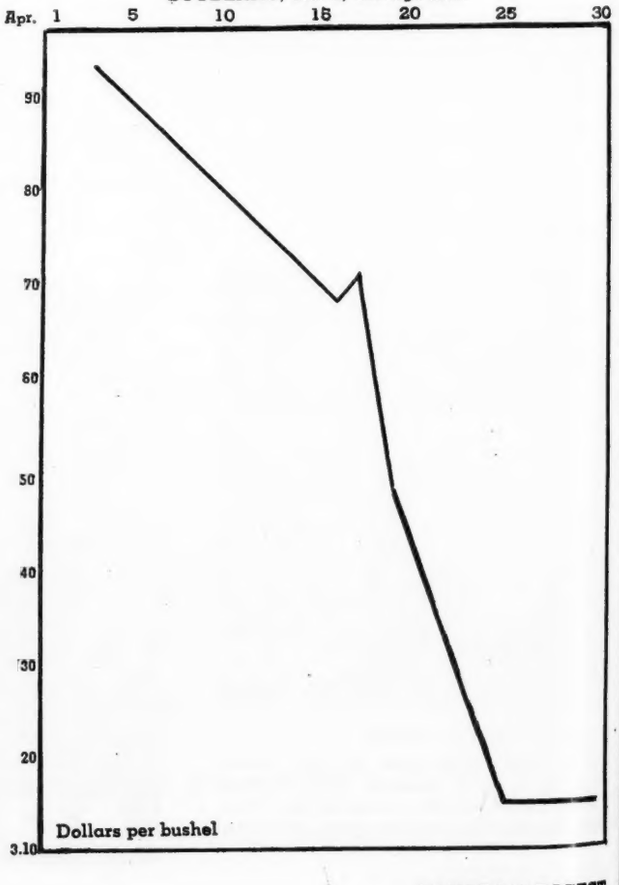
The oil meal market was slow all month. The price structure was confused, and sellers and buyers were frequently far apart. Supplies for current needs were ample. There was little interest in deferred shipments.

Factors in the weaker market were said to be a slow demand for mixed feeds which picked up just a little at month's end; and a slowdown in Army shipping instructions for soy flour bought for shipment abroad that resulted in greater meal production. Most transactions during the month were for prompt delivery.

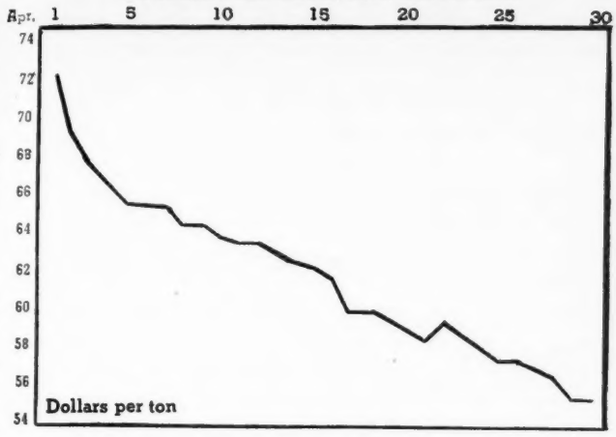
Month's opening on bulk oil meal, Decatur basis was $72.50; the close $55.25.

Soybean oil continued the decline begun the middle of March. The April 1 quotation for crude soybean oil, Decatur basis was 31c. By April 30 the market had worked down to 22c, or 13c below the high point of 35c March 13. Production of soybean oil increased slightly in March.

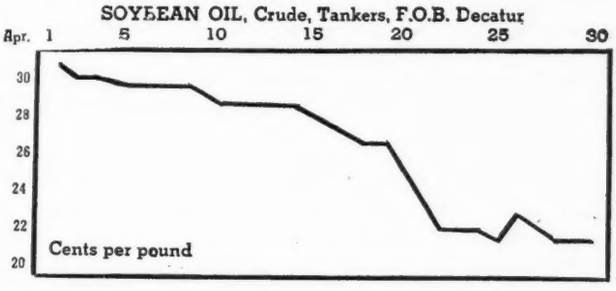
The telephone workers' strike brought activity in oil trading to a standstill. Buying interest was not great and there was fre-



SOYBEAN OIL MEAL, Bulk, Basis Decatur



SOYBEAN OIL, Crude, Tankers, F.O.B. Decatur



quent difficulty in getting buyers and sellers together.

But at month's end offerings were scarce at quoted prices.

*SOYBEAN MEAL FUTURES—MEMPHIS, APRIL 30
Contract—100 tons

Decatur (bulk basis)		Decatur—(sacked basis)	
May	$65.00	May	$58.50
July	51.50@53.00	July	55.50@56.00
October	48.00	October	51.50@53.50
December	46.50@48.00	December	50.50@52.50
January, 1948	45.00@47.00	January, 1948	48.50@50.00
March, 1948	44.00@47.00	March, 1948	47.00@49.00
Sales, none.		Sales, 600.	

*N. Y. SOYBEAN OIL FUTURES, APRIL 30

	Open	High	Low	Close	Pr. cl.
May	....	....	....	26.50	26.50
July	....	....	...	23.98	23.98
September	....	....	....	20.00	20.00
October	....	....	....	18.50	19.00
December	....	....	....	16.50	16.50
January, 1948	....	....	....	16.00	16.00
March, 1948	....	....	....	16.00	16.00

Total sales, none.

*Reported by the Chicago Journal of Commerce.

● SOYBEAN STOCKS. Stocks of soybeans on farms April 1 totaled only 25 million bushels, reports USDA's crop reporting board. This is nearly 5 million below the farm stocks of a year ago and the lowest April 1 farm stocks since the record began in 1943.

The small stocks were expected since a large proportion of

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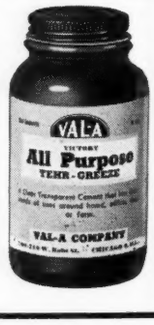

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the 1946 crop had moved to market before January 1. Farm stocks at that time were already low.

	Thousand bushels 1946	1947		Thousand bushels 1946	1947
N. Y.	14	36	Del.	134	148
N. J.	58	53	Md.	172	166
Pa.	83	128	Va.	278	288
Ohio	3,489	2,763	W. Va.	3	4
Ind.	4,860	3,295	N. C.	810	1,030
Ill.	11,280	7,504	S. C.	25	35
Mich.	448	387	Ga.	20	22
Wis.	83	87	Ky.	211	251
Minn.	983	1,601	Tenn.	121	97
Iowa	4,594	4,545	Ala.	125	52
Mo.	1,123	1,292	Miss.	161	200
N. Dak.	13	16	Ark.	435	491
S. Dak.	16	66	La.	64	95
Nebr.	28	48	Okla.	6	5
Kans.	235	261	U. S.	29,872	24,966

● SOYBEAN INSPECTIONS. Inspected receipts of soybeans in March showed considerable increase over those for the preceding month, according to inspectors' reports to the grain branch of the Production and Marketing Administration. March inspections totaled 4,172 cars compared with 2,681 cars in February and the March average of 4,701 cars for the crop years 1940-45. Inspected receipts for October-March this season were 69,417 cars compared with 71,751 cars for the same period last year.

● SOYBEAN OIL OUTPUT. March production of crude and refined soybean oil increased slightly from February, according to preliminary figures released by the Bureau of the Census. Production of crude soybean oil was reported at 145 million pounds, 3% more than the output in February and 7% more than March of last year. Factory and warehouse stocks amounting to 80 million pounds showed an 18% decrease from February and were 47% less than the stocks reported in March 1946.

Production of refined soybean oil totaled 121 million pounds, approximately the same as the reported output for February 1947 and 2% more than March 1946. Stocks at the end of the month dropped to 73 million pounds, 6% below stocks at the end of February. Compared with inventories reported for March of last year, a decrease of 34% was shown.

SOYBEANS AND SOYBEAN OIL, MARCH 1947

Item	Unit	March 1947	Feb. 1947	March 1946
Soybeans				
Crushed	Short tons	495,384	*479,480	*461,022
Stocks at oil mills (end of month)	Short tons	1,258,555	*1,570,126	*1,118,983
Crude soybean oil				
Production	M pounds	145,212	*141,115	*135,739
Stocks (end of month)	M pounds	80,082	*97,226	*150,833
Refined soybean oil				
Production	M pounds	121,389	120,867	119,199
Stocks (end of month)	M pounds	72,501	*76,995	*110,194

* Revised

● COMMERCIAL SOYBEAN STOCKS. Production and Marketing Administration's commercial grain stock reports for April.

U. S. Soybeans in Store and Afloat at Domestic Markets (1,000 Bu.)

	Apr. 1	Apr. 8	Apr. 15	Apr. 22	Apr. 29
Atlantic Coast	238	236	236	214	194
Gulf Coast	186	186	186	186	186
Northwestern and Upper Lake	2,690	2,575	2,453	2,343	1,954
Lower Lake	5,355	4,754	4,434	2,915	3,186
East Central	3,445	3,175	2,927	2,603	2,536
West Central, Southwestern & Western	1,775	1,636	1,506	1,392	1,290
Pacific Coast					
Total current week	13,689	12,562	11,742	9,653	9,346
Total year ago	12,666	11,872	11,204	10,392	9,436

U. S. Bonded Soybeans in Store and Afloat at Canadian Markets

Total current week	79		67	46	39

Total North American Commercial Soybean Stocks

Current week	13,768		11,809	9,699	9,385
Year ago	12,666	11,872	11,204	10,392	9,436

● STANDARD SHORTENING SHIPMENTS. Reported by members of Institute of Shortening Mfgrs., in pounds.

Week ending	
April 5	4,154,350
April 12	2,838,148
April 19	2,256,995
April 26	1,797,219
May 3	1,719,134